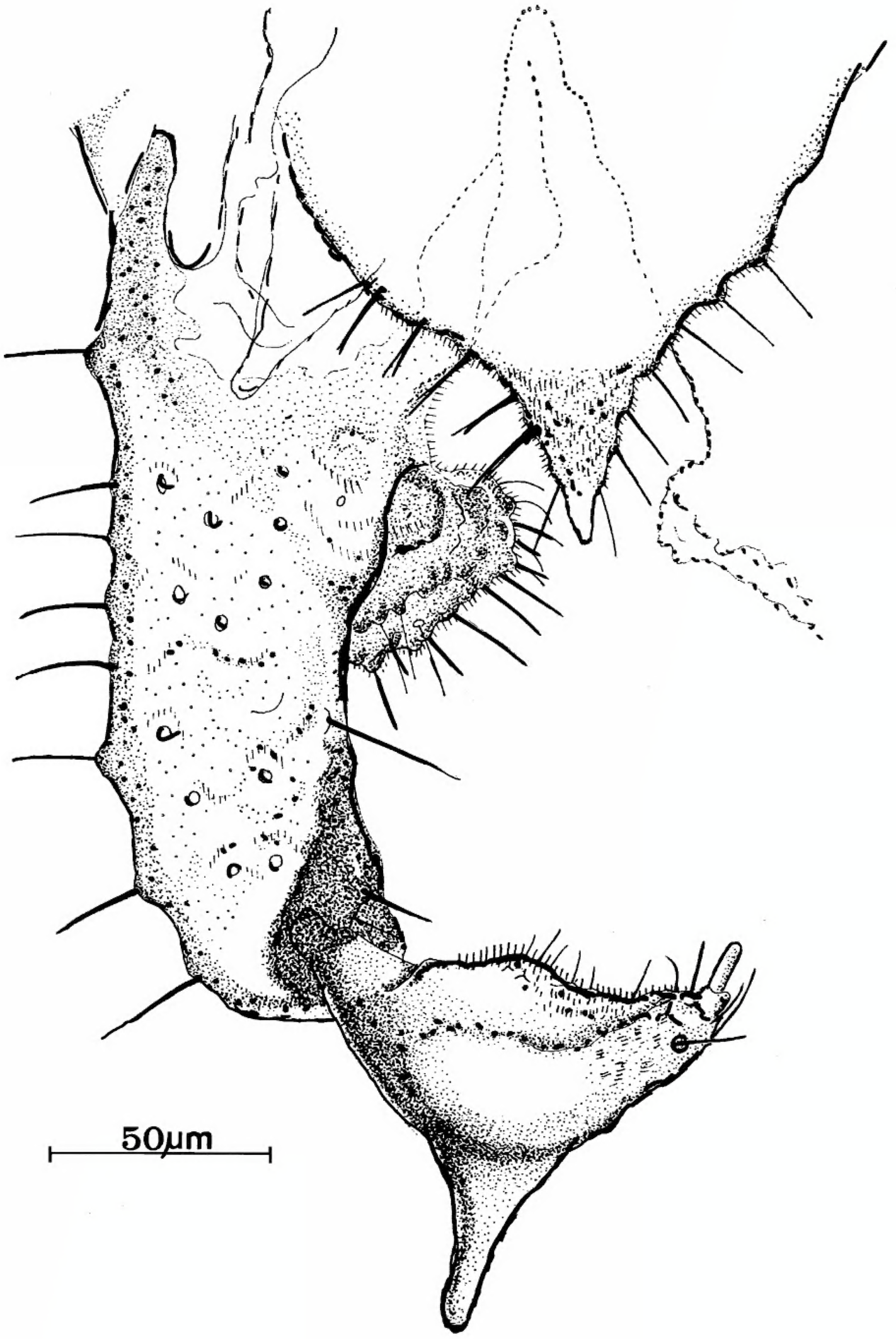
CHIRONOMIDAE (DIPTERA) OF IRELAND – A REVIEW, CHECKLIST AND THEIR DISTRIBUTION IN EUROPE

Declan A. Murray, James P. O'Connor & Patrick J. Ashe



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The front cover

The front cover shows part of the male hypopygium of *Zalutschia humphriesiae* Dowling & Murray, 1980.

The back cover

The back cover shows part of the the pupa of *Zalutschia humphriesiae* Dowling & Murray, 1980.

Frontispiece

This volume is dedicated to C. F. Humphries (1909 – 1986)
Professor of Zoology, University College Dublin, 1957 – 1979

Carmel F. Humphries Ph.D., D.Sc., M.R.I.A.

An inspiring scientist

"*The Chironomidae is one of the most, if not the most, important group of freshwater organisms*"

Quote from Humphries (1938) The chironomid fauna of the Grosser Plöner See, the relative density of its members and their emergence period. *Archiv für Hydrobiologie* **33**: 353-548.

CHIRONOMIDAE (DIPTERA) OF IRELAND – A REVIEW, CHECKLIST AND THEIR DISTRIBUTION IN EUROPE

by

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Foreword

As Professor of Zoology at University College Dublin, it gives me particular pleasure to be associated with this publication. It represents the culmination of research carried out on the non-biting midges or Chironomidae at the university by three generations of scientists. The studies were initiated by Carmel F. Humphries who passed the mantle to her student Declan A. Murray who through the course of his academic career in University College Dublin directed multiple graduate students, including Patrick J. Ashe who has also been prominent in research on Chironomidae. The present work is based on studies during more than sixty years that has produced a catalogue of some 540 species for Ireland based on over 22,400 records. Having a lineage that has made such a valuable contribution to the study of Irish biodiversity is truly extraordinary in these times and it is one that zoologists at UCD are particularly proud of.

Almost every aspect of human well-being is dependent on the species with which we share our Earth. The food we eat, the air we breathe and the water we drink are all either directly produced by other species, or their quality is dependent on the activities of these species. However, one of the greatest threats to the sustainability of life on Earth is the loss of biodiversity through the impacts of human activities. Indeed, best estimates suggest that we may already have passed the safe operating space for the provision of ecosystem services globally.

R. M. May has pointed out that “unlike essentially all other scientific disciplines, conservation biology is a science with a time limit, with the clock ticking faster as the human population continues to increase’. Despite centuries of study, we do not know to within an order of magnitude how many species exist on Earth and, as E. O. Wilson says, “we know less about life on Earth than we know about the surface of the moon and Mars”.

Against this background the number of institutions offering formal training in taxonomy and the number of taxonomists working in western countries are declining at an alarming rate. It is in this context that we should see the value of publications such as *Chironomidae (Diptera) of Ireland – a review, checklist and their distribution in Europe*. In this publication, a significant group from the Irish fauna is catalogued and placed in its European context by three accomplished taxonomists who have devoted their careers to the study of the Irish entomofauna and to the taxonomy of the Chironomidae globally.

Thomas Bolger
Full Professor and Chair of Zoology
University College Dublin.
7 April 2018

PLATE 1. Adult male *Chironomus plumosus* – “duck fly”.
Photograph © Didier Descouens. Wikimedia Commons (accessed 3 March 2018).
<https://commons.wikimedia.org/wiki/File:Chironomus_plumosus_MHNT.jpg>

Preface

Chironomids are predominantly unobtrusive insects except to anglers. The adults are commonly known as non-biting midges, dancing midges, duck flies and buzzers or gnats. Sometimes the larvae are called bloodworms. The juvenile stages are often the most abundant invertebrate animals in aquatic ecosystems and in freshwaters, along with caddisflies, mayflies and stoneflies, they serve as a major link in the food chain between primary producers and fish in a food web that ultimately includes human consumers. Their range of habitats is astonishing ranging from rivers and lakes to temporary water bodies and rot-holes in trees. A minority are terrestrial species that are associated with moist soil habitats rich in organic matter such as fungi and cow-pats.

Some species require pristine conditions for survival and rapidly succumb to harsh environments but others can tolerate polluted locations. As a result, they are useful biological indicators of water quality in rivers, lakes and reservoirs and for the biomonitoring of organic pollution, eutrophication, acid rain and environmental change.

Ireland has a rich chironomid fauna and some 520 species have now been recorded from the island. Despite A. H. Haliday describing two species new to science from Ireland in the eighteen-fifties, the group was very neglected here for many years until Professor Carmel Humphries of University College Dublin (to whose memory this book is dedicated) encouraged the senior author to undertake his life-time study of these fascinating insects. He in turn became the mentor for many students including one of the co-authors Patrick Ashe. A history of Irish chironomid studies is included and interestingly, this has had an extensive international dimension through co-operation with foreign entomologists and active participation in many of the International Symposia on Chironomidae.

Irish and European distribution maps are provided for all the species known from the island with an accompanying commentary which also includes ecological data. The Irish distributions are based on data from 22,468 species records from 1,247 locations in the 32 Counties and 40 hydrometric areas and some off-shore islands.

Chironomidae (Diptera) of Ireland – a review, checklist and their distribution in Europe is published by the Irish Biogeographical Society in association with University College Dublin and the Environmental Protection Agency. We are very grateful to Professor Thomas Bolger for his assistance and for writing the Foreword. The Society has a proud history of publishing such all-Ireland studies in the *Bulletin*, the *Macro* and the *Occasional Publication* series. Examples are *A checklist of Irish aquatic insects* and *A catalogue and atlas of the caddisflies (Trichoptera) of Ireland*.

Finally, we would like to thank all of those who have made this book possible. Their names will be found in the extensive acknowledgements on pages ix-x.

The authors

PLATE 2. Carmel Humphries and Declan Murray in University College Dublin, 1965, identifying pupal exuviae from Thienemann (1944) Bestimmungstabellen für die bis jetzt bekannten Larven und Puppen der Orthocladiinen (Diptera Chironomidae). *Archiv für Hydrobiologie* **39**: 551-664.

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The Irish distribution maps were prepared using DMAP and the authors are grateful to Dr Alan Morton for supplying the relevant programme.

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Abstract

Studies on the Irish Chironomidae are briefly reviewed. A checklist of 520 species and 20 species level taxa, is provided. *Chironomus striatus* Strenzke, 1959 is removed from the Irish list. Summary distribution data are given with accompanying maps depicting the known Irish and European distributions for the species currently on record from Ireland. Data from 22,468 species records up to December 2017 from 1,247 locations in the 32 Counties and 40 hydrometric areas and some off-shore islands of Ireland are summarised.

Key words: Chironomidae, non-biting midges, inventory, distribution, Ireland, western Palaearctic.

Introduction

Members of the insect family Chironomidae (Insecta: Diptera), whose adults are commonly called non-biting midges, dancing midges, duck flies, buzzers or gnats and some of whose larvae are called bloodworms, are predominantly unobtrusive insects (Plate 1). The family has a global distribution with an estimated 15,000 species world-wide while 1,273 species are on record in Fauna Europaea (Spies and Sæther, 2013). Juvenile chironomids are often the most abundant invertebrate animals in aquatic ecosystems and in freshwaters, along with caddisflies (Trichoptera), mayflies (Ephemeroptera) and stoneflies (Plecoptera), they serve as a major link in the food chain between primary producers and fish in a food web that ultimately includes human consumers. In running waters they occupy habitats in rivers, streams, waterfalls, thin water films on vertical rock surfaces, seepages and glacial meltwater. In standing waters they are found in lakes, ponds, pools, a variety of temporary water bodies (including garden barrels and rain-filled containers), phytotelmata, tree rot-holes and in the leaf-axils of pitcher plants and bromeliads. Some inhabit saline lakes and marine coastal brackish water habitats while a small minority occur in coastal waters to a depth of 30 metres. A minority are terrestrial species that are associated with moist soil habitats rich in organic matter, in leaf litter in woodland, in grassland and tillage soils and in fungi, rotting wood and cow dung. Chironomids have also

been found in subterranean caves as recently reported by Andersen *et al.* (2016) who described a new species that is a true troglobiont – an obligatory cave-dweller - from a depth of 980 metres in the Trojama Cave in Croatia.

Chironomids are remarkable for their diversity and the tolerance of larvae of different species to a wide range of environmental conditions. Some require pristine conditions for survival and rapidly succumb to harsh environments while others can tolerate polluted locations. Consequently, they are useful biological indicators of water quality in rivers, lakes and reservoirs and for the biomonitoring of organic pollution, eutrophication, acid rain and environmental change. In 1938 Carmel F. Humphries (Ph.D. mentor of the senior author) former professor and head of the Department of Zoology at University College Dublin, to whom this work is dedicated, wrote of the chironomids "*The Chironomidae is one of the most, if not the most, important group of freshwater organisms*" (Humphries, 1938). Even now, eighty years later, chironomids are frequently merely superficially treated in general ecological surveys, partly because of a perceived time-consuming difficulty in their identification to species level.

Approaches to studies on Chironomidae

Early studies on Chironomidae were based on the traditional method of capturing adult insects by net in flight followed by identification from examination of the gross external morphology of dried, pinned and carded specimens. Little attention was given to the juvenile stages of Chironomidae at that time. Larvae were largely ignored and the perception was that the mature chironomid pupa was "hardly more than the fly enclosed in a temporary skin and details of its structure cannot be understood without constant reference to the structure of the fly" (Miall and Hammond, 1900). However, the value of that pupal "temporary skin" was recognised by the distinguished German taxonomist and limnologist, August Thienemann, at the Hydrobiologische Anstalt der Kaiser Wilhem Gesellschaft (later to become the Max-Planck Institüt für Limnologie) in Plön, Germany. Thienemann (1910) noted that many structural details of the chitinous skin enclosing the developing pupa (the *puppenhäute* or pupal exuviae that is cast off as the adult emerges) were species specific. From examination of pupal exuviae collected by fine mesh nets along lake shores, Thienemann (*loc. cit.)* suggested the technique as useful to establish species composition and he advocated its use in ecological and taxonomic studies. Malloch (1917) made use of features of the immature stages and, in his systematic appraisal of biting and non-biting midges, used larval, pupal and adult characters in establishing separate family status for the Ceratopogonidae and Chironomidae respectively.

It was not until later in the first half of the 20th century that the use of pupal exuviae gained greater acceptance in chironomid taxonomy - and in faunal surveys. An innovative early application of the methodology was the study by Carmel F. Humphries at the Hydrobiologische Anstalt der Kaiser Wilhem Gesellschaft in

Germany. In 1936, under the tutelage of August Thienemann, Humphries investigated seasonal periodicity of emergence of adult Chironomidae from the Grosser Plöner See, Germany, based on collections of pupal exuviae (Humphries, 1938). In running waters a masterpiece application, on a global scale, was Lars Brundin's work investigating transantarctic relationships in the southern hemisphere that was based on specimens trapped in fine-meshed nets set in flowing waters (Brundin, 1966). The unbiased collections yielded pupal exuviae, mature pupae and partially emerged (pharate) adult Chironomidae highlighting the efficiency of a technique that came to have widespread application in faunal inventory work. Many of the distribution records of Chironomidae in Ireland are now derived from pupal exuviae identified in collections by fine mesh net along lake shores, ponds or small water bodies and in drift-nets from rivers.

The present work gives a brief review of studies on Irish Chironomidae, provides a current checklist and catalogue with summary distribution data and maps depicting the known distribution of species in Ireland - and in western Palaearctic Europe as documented in Spies and Sæther (2013).

Abbreviations and symbols used

auct. – of authors; **Co.** – County; ***et al.*** – *et alia*; **CPET**– Chironomid Pupal Exuviae Technique; **DAM** – D. A. Murray; **EPA** – Environmental Protection Agency; **GB-NI** – Great Britain, Northern Ireland; **HA** – Hydrometric Area; **IGR** – Irish Grid Reference; **JPOC** – J. P. O'Connor; **nec** – and not; **MPI** – Max Planck Institut; **Pe** or **pe** – pupal exuviae; **RBD** – River Basin District; **ROI** – Republic of Ireland; **sp.** – species; **UCD** – University College Dublin; **ZSM** – Zoologische Staatssammlung, München; "+" – species known from ROI; "*"– species known from GB-NI; "+*" – species known from ROI and GB-NI.

Overview of studies on Irish Chironomidae

The 19th to mid 20th century

Literature on 19th century studies on Irish Chironomidae is limited. A manuscript compiled in 1833 by Alexander H. Haliday, now in the Natural History Museum, National Museum of Ireland, Dublin, has notes on thirty-three species. Regrettably the manuscript does not give information on actual collection sites - apart from noting that records were from Clifden, Holywood, Lough Neagh and the Mourne Mountains in County Down, from Templeogue in County Dublin and from Killarney in County Kerry. Haliday described the marine chironomid *Clunio marinus* from south-west Ireland (Haliday, 1855) and *Diamesa tonsa* from County Down (Haliday in Walker 1856). He gave other Irish records that were published in Insecta Britannica (Walker, 1856). Further records from the beginning of the 20th century were given by Yerbury (1902) from Counties Cork and Kerry, by Grimshaw (1912) from County Mayo during the Royal Irish Academy's Survey on Clare Island and later by Edwards (1929)

from the environs of Killarney, County Kerry. Some 58 species were documented in Ireland by 1930.

Significant advances in knowledge of the Irish chironomid fauna were made by C. F. Humphries on her return from Germany in the late 1930s. Unlike earlier Irish workers on chironomids, Humphries concentrated her studies on the juvenile larval and pupal stages. The few adults inadvertently collected, or reared from pharate pupae, were sent abroad to the prominent Belgian entomologist, Maurice Goetghebuer, for identification. Her work on the chironomid fauna of the submerged mosses in the River Liffey with Winifred Frost (Humphries and Frost, 1937), together with unpublished records in postgraduate theses of her research students Grey (1946), Fitzgerald (1947) and Reilly (1951) in University College Dublin and in her published works (Goetghebuer *et al*., 1949; Humphries, 1951), added to the Irish species list and approximately 70 species were on record by 1950.

The late 20th century

Carmel Humphries was appointed Professor and head of the Department of Zoology at University College Dublin, in 1957. With her background interest in inland waters she encouraged and promoted research in aquatic sciences and, as well as investigating the Irish Chironomidae, was actively involved with postgraduate students in ecological and taxonomic work on freshwater Trichoptera, Ephemeroptera, Acari and the groundwater niphargid Crustaceans (Murray *et al*., 1999). Under her direction the Department of Zoology produced a succession of graduates and Carmel Humphries has been credited with having inspired a generation of Irish zoologists (Duke, 2009), including the present authors.

As part of his final undergraduate year B.Sc. Honours Zoology degree studies in University College Dublin in 1964-65 the senior author was assigned a project investigating the food and feeding habits of brown trout in the River Camlin, County Longford, that was part of an ongoing stock assessment study by the then Inland Fisheries Trust Inc. (now Inland Fisheries Ireland). Examination of fish stomach contents and the composition of the resident aquatic invertebrate fauna in the river were integral components of that research. Thus began faunal sampling, and a fascination with aquatic invertebrates – especially the chironomids. Humphries recognised that developing interest and, on graduation in 1965, encouraged him to apply for a three-year Research Studentship from the Irish Department of Agriculture and Fisheries to further studies on the Chironomidae. On receipt of the Studentship, his Ph.D. studies commenced in University College Dublin in September 1965 on the Irish Chironomidae - the beginning of a life-long association with non-biting midges. (Plate 2).

By that time Humphries had realised the value of linking larvae and pupae with named adult species and the need for an individual researcher to have familiarity with, and the expertise to study, all life history stages – so adult chironomids were also

collected, or reared from juvenile stages in the Ph.D. research work. Rather than using gross adult external morphology alone for species identification, more subtle morphological features - particularly genitalia - were studied in cleared, slide-mounted, specimens. Although Humphries was an accomplished limnologist and an expert on the taxonomy and identification of juvenile chironomids, she freely admitted her unfamiliarity with the adult midges and initially insisted that specimens identified in that project should be sent to her acquaintance, Paul Freeman, in the British Museum (Natural History), London, for verification of identification. After a short period she received a letter from Freeman advising her that there "was no need for her student to persist in sending specimens as he was perfectly capable of correctly identifying the adults himself". The investigations from over 80 locations on "*The Chironomid fauna and its distribution in Ireland*" during the tenure of the Fisheries Studentship yielded distribution data and a checklist of 212 species incorporating changes in taxonomic nomenclature (Murray, 1972) that also included records from Lough Neagh in Northern Ireland by Marks and Hendersen (1970).

International dimension

On appointment to the academic staff of the Zoology Department, University College Dublin in 1968 the senior author continued to cultivate the tradition of studies on Chironomidae established by Humphries through personal and directed research. With awards of a Fellowship from the *Deutscher Akadameischer Austausdienst* (DAAD) and a subsequent Scholarship from the *Max Planck Gesellschaft*, he spent pertinent interludes between 1971 and 1975 at the invitation of E. J. Fittkau (his Ph.D. external examiner) at the Max Planck Institute für Limnologie, Plön (the research institute that replaced the former Hydrobiologische Anstalt where Humphries had worked with August Thienemann). There he gained valuable experience on chironomid taxonomy and the merit of collecting and examining pupal exuviae, from Fittkau (Sepp) and his colleague Friedrich Reiss (Frieder) who both became his life-long friends. (Plate 3). Contact continued after Sepp Fittkau was appointed Director of Zoologische Staatssammlungen, München in 1976 when he brought his colleague, Frieder Reiss, with him as curator of the Diptera collection in the museum. A lasting collaboration was established between Dublin and Munich with multiple visits to Bavaria over the following 30 years – not only by the senior author but also by co-author Patrick Ashe who commenced studies on Chironomidae of the River Flesk, Killarney, County Kerry, in 1976 under his direction. Sadly, Frieder died in 1999 and Sepp, who visited Ireland in 2007 (Plate 4), died in 2012. Contact with Zoologische Staatssammlungen, München has continued with the next generation of "chironomidologists", now between co-author Patrick Ashe with Martin Spies and the current curator of Diptera at the museum, Marion Kotrba (Plate 5).

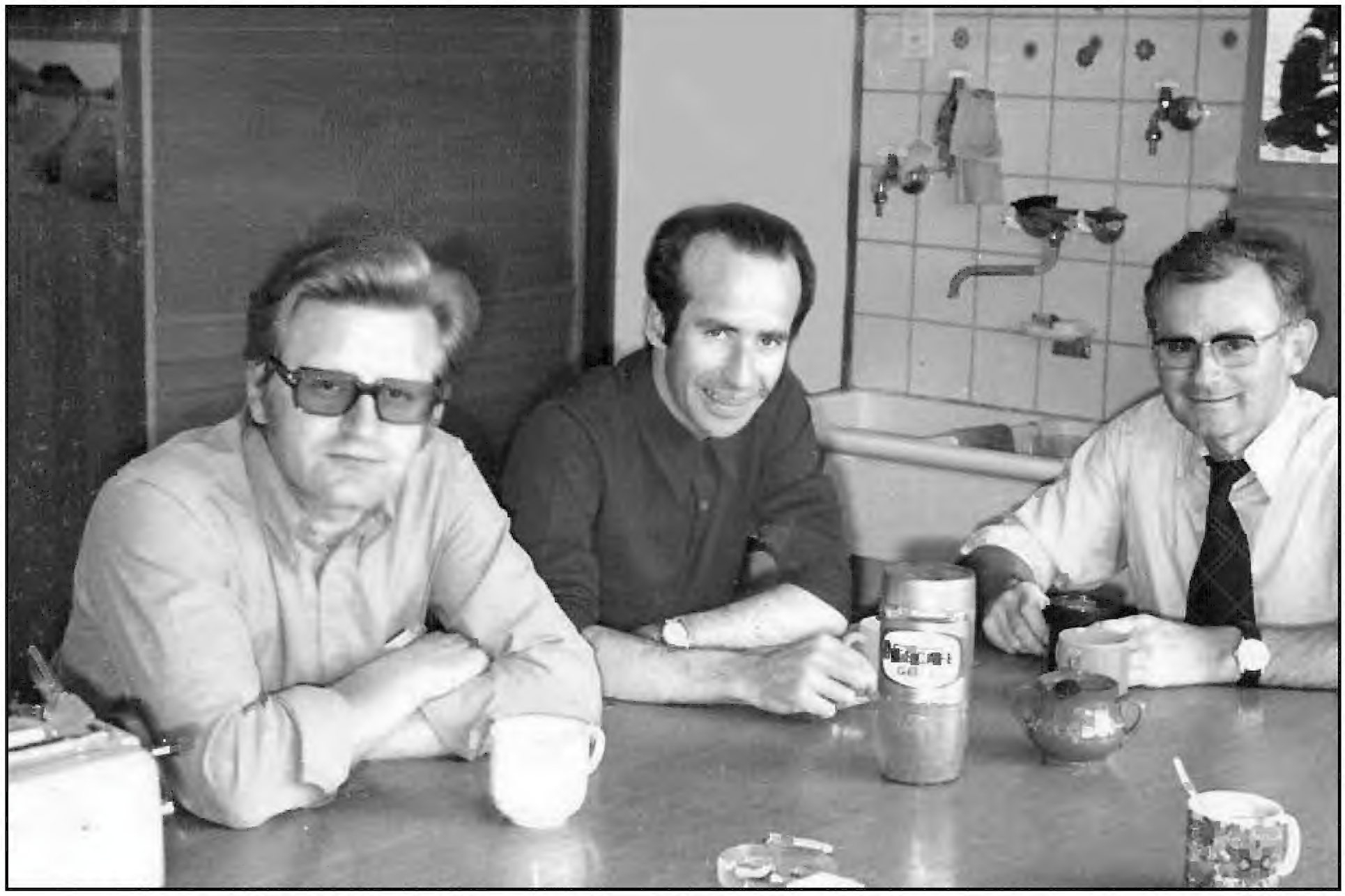


PLATE 3. Friedrich Reiss, Declan Murray and Sepp Fittkau in MPI Plön, 1975.

International Symposium on Chironomidae series

To encourage and promote cooperation in research on Chironomidae at an international level, E. J. Fittkau arranged a gathering in 1964 at the Max Planck Institut für Limnologie in Plön. At that meeting he stressed the importance of regular meetings for the exchange of information and collaboration between chironomid research workers. An outcome of that gathering was the formal establishment of a symposium series to be held at approximately three year intervals (Palmén, 1968). The next symposia were organised in Helsinki, Moscow and then in Ottawa in 1970 before the senior author, along with Professor C. F. Humphries participated at the 5th symposium in 1973 held at Abisko, at Lake Torneträsk, Swedish-Lappland, where he presented a paper on his studies in the Killarney region (Murray, 1974). At the following 6th International Symposium in Prague, Czechoslovakia in 1976, an invitation to host the next symposium in Ireland was accepted. With assistance and cooperation of co-authors Patrick Ashe, Jim O' Connor and others, the 7th International Symposium on Chironomidae was held in July 1979 at University College Dublin (Murray, 1980) (Plate 6). Eighty three delegates from twenty one countries convened for the symposium that was formally opened by Carmel Humphries (Plate 7) who had just then retired from academia. In recognition of Thienemann's contributions to research on the Chironomidae, the August Thienemann keynote lecture series was initiated at the symposium when Lars Brundin, the eminent Swedish taxonomist and phylogenetic systematist, delivered the inaugural August

Thienemann Lecture "*Methods and principles of phylogenetic biogeography*"(Plate 8).

PLATE 4. Sepp and Elise Fittkau with Declan and Freddie Murray, Ireland, 2007.

PLATE 5. Martin Spies, Marion Kotrba with Patrick Ashe, Munich 2017.

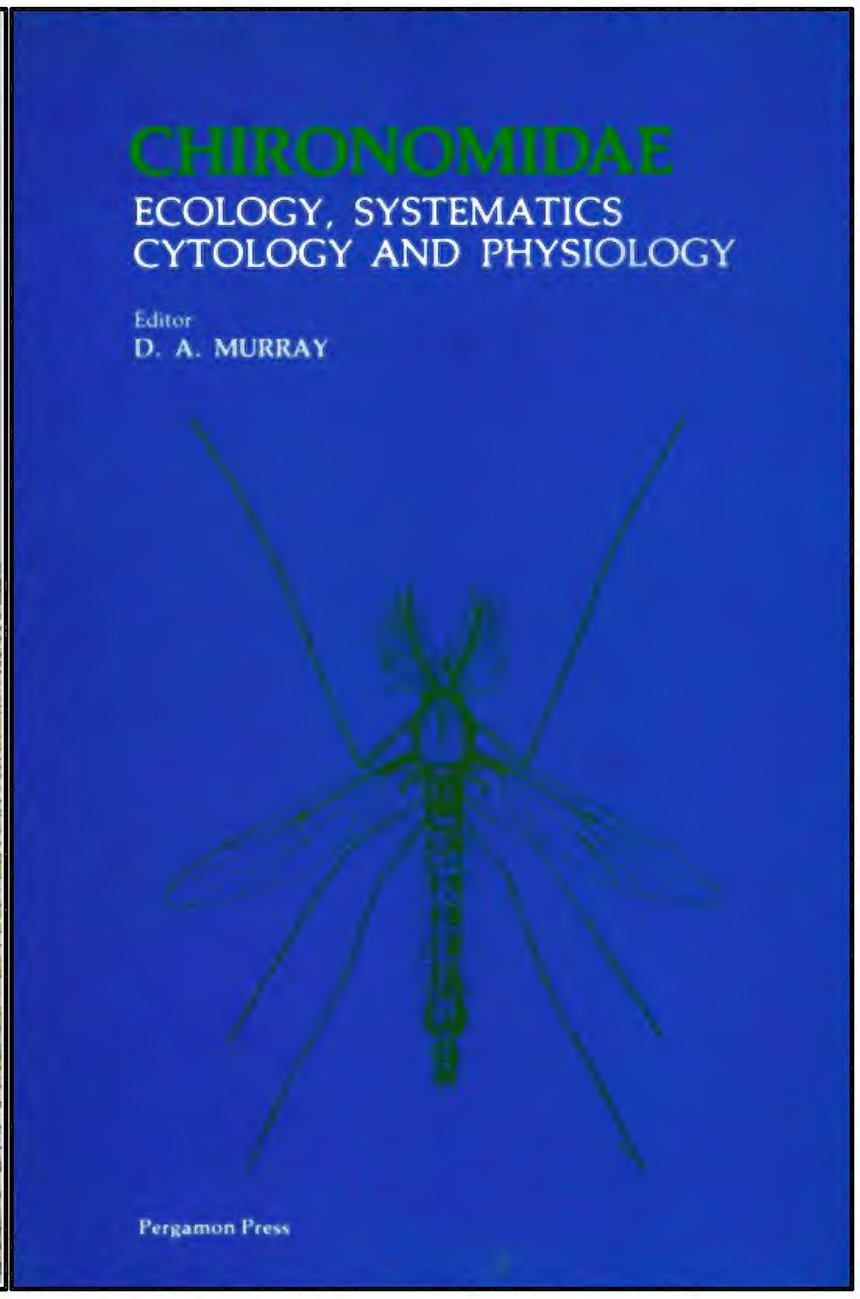


PLATE 6. 7th International Symposium on Chironomidae, 1979.

PLATE 7. Carmel Humphries. 1979. The opening talk at the Symposium.

PLATE 8. Lars Brundin. 1979. Delivering the Thienemann Lecture, Dublin.

Twenty one years after Brundin presented the inaugural Thienemann lecture in Dublin, the senior author delivered the keynote Thienemann Lecture "*Chironomidae (Diptera) - a review and comments on some West Palaearctic island faunas*" in August 2000 at the 14th International Symposium on Chironomidae at the Instituto Oswaldo Cruz in Rio de Janeiro, Brazil (Plate 9). The authors, individually or together

have participated at symposia in the intervening years while all three together attended symposia in Freiburg in 2003 and Madeira in 2006 (Endpieces - Plate 23).

PLATE 9. Declan Murray, 2000. Thienemann Lecture, Rio de Janeiro, Brazil.

These triennial gatherings were, and are, invaluable not only for communicating research but also for promoting and enhancing international research collaboration. At the symposium in Dublin, discussion continued on the lack of modern determination keys to all life history stages of chironomids. The first attempts to address this issue led to the multi-authored publication of guides to the identification of genera of larvae, pupae and adult male "Chironomidae of the Holarctic Region" edited by Torgny Wiederholm (Wiederholm, 1983, 1986, 1989). During the symposium in Dublin, the senior author was invited to join the panel participating in that undertaking and subsequently co-authored the diagnoses and identification keys to genera of pupal exuviae (Fittkau and Murray, 1986) and adult males (Murray and Fittkau, 1989) of the Tanypodinae of the Holarctic region. Continuing international collaboration between Ole Sæther, University of Bergen, Norway and Patrick Ashe and Declan Murray led to publication of keys to the genera of Chironomidae of the Palaearctic Region

(Sæther, Ashe and Murray, 2000). Since then Patrick Ashe has pursued that tradition of international cooperation and in collaboration with Peter Cranston (Australia National University, Canberra) has provided revised keys and diagnoses to larvae of Buchonomyiinae (Cranston and Ashe, 2013a) and Telmatogetoniinae (Cranston and Ashe, 2013b) in the updated edition of keys and diagnoses to larvae of Chironomidae of the Holarctic Region (Andersen *et al.*, 2013). More recently, in collaboration with colleagues in the Bergen Museum and the Norwegian University of Science and Technology, Trondheim, Patrick Ashe has also co-authored the Chironomidae chapter of the Manual of Afrotropical Diptera (Ekrem *et al.*, 2017).

A growing inventory of Irish Chironomidae

From the initial listing of Chironomidae in Ireland by Murray (1972), the Irish species inventory increased markedly in the following years when the Department of Zoology in University College Dublin was an active centre for broad aspects of research on the Chironomidae. Under the senior author's direction over a period of thirty years, a succession of Masters and Doctoral research projects were undertaken in a range of rivers, lakes and other aquatic habitats by, among others, Dermot Douglas (Douglas, 1975), Colette Dowling (Dowling, 1975), Patrick Ashe (Ashe, 1982), Liam Heneghan (Heneghan, 1986), Churchill Omoku (Omoku, 1986), Declan Morgan (Morgan, 1989), Emmet Gavin, (Gavin 1989), Brian Hayes (Hayes, 1991), Fiona Curran (Curran, 2001) and Wayne Trodd (Trodd, 2003). These studies made significant contributions to knowledge on the distribution, ecology and taxonomy of the extant Irish Chironomidae. Historical aspects of the Irish chironomid fauna were investigated in palaeolimnological studies of chironomid microfossil larval head capsules in sediment cores (Douglas and Murray, 1987) using coring apparatus designed and constructed by the senior author (Murray, 1976a) (Plate 10). Accounts of research on Chironomidae in Ireland from 1970 to 2000 are given in Murray (1998, 1999a, 2000a).

Published records in Fahy and Murray (1972), Bracken and Murray (1973), Murray (1974, 1976b, c), Carter (1975), Pinder and Cranston (1976), Douglas and Murray (1980, 1987), Dowling and Murray (1980, 1981), Dowling *et al*. (1981), Morgan (1989), Murray and Ashe (1981a, b, 1982) and Murray and O'Connor (1982), were incorporated into the updated checklist of 347 species presented at the 8th International Symposium on Chironomidae at Talahasse, U.S.A. (Murray and Ashe, 1983). Further records over the next 15 years reported by Sæther and Sublette (1983), Murray and Fittkau (1986), Ashe (1987), Heneghan and Murray (1987), Bond *et al*. (1988), Hayes and Murray (1988, 1989), Morgan and Murray (1988), Sæther (1990), Soponis (1990), Tokeshi (1990), Hayes (1991), Murray and O'Connor (1992), Ashe and O'Connor (1994, 1997), Murray (1996) and Langton and McLarnon (1998), led to the inventory of 396 species in the checklist in Ashe *et al*. (1998) that was produced to coincide with the 27th Congress of Societas Internationalis Limnologiae in Dublin.

PLATE 10. Declan Murray retrieving a sediment core from 67 metres depth with his coring equipment on Lough Leane, Killarney, County Kerry, in 1987.

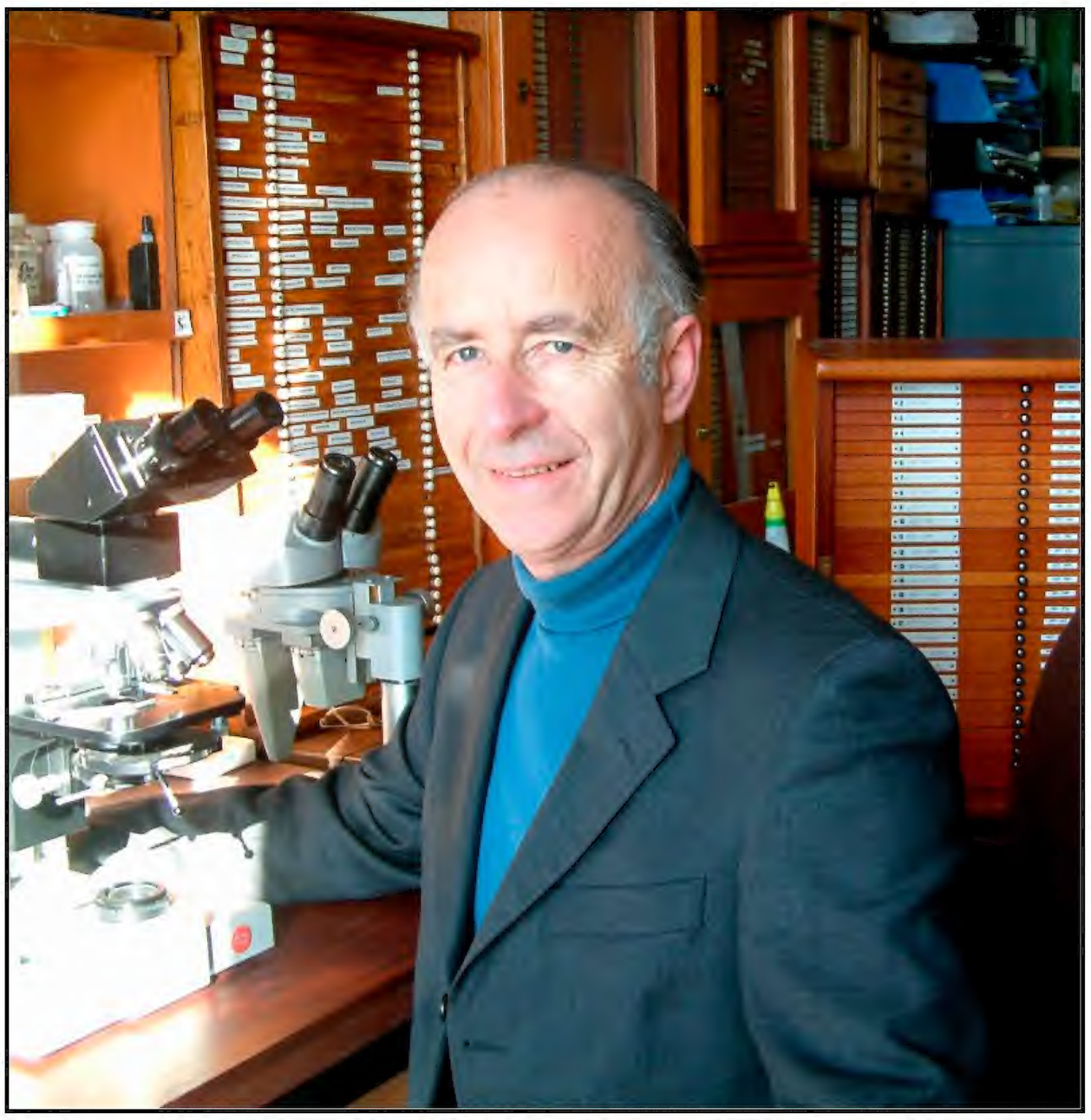


PLATE 11. Declan Murray, post retirement. Working on the Chironomidae at home.

21st Century studies

Ongoing compilation of species records and distribution data

On his retirement from University College Dublin in 2001 the senior author has remained active in research on Chironomidae from home (Plate 11). With an award in 2004 from the Heritage Council of Ireland, a slide-mounted reference collection was assembled and an updated checklist of chironomid species known from Ireland was compiled (Murray, 2005). The collection (the Heritage Council Collection of Irish Chironomidae) was presented to the National Museum of Ireland (Plate 12).

PLATE 12. Presentation of the Heritage Council Collection of Irish Chironomidae to the National Museum of Ireland. Professor Thomas Bolger, University College Dublin; Nigel Monaghan, National Museum of Ireland; Dr Liam Lysaght, Heritage Council of Ireland; Declan Murray; Dr Hugh Brady, President, University College Dublin and Eanna Ní Lamhna, President, An Taisce, broadcaster and naturalist.

An award from the Praeger Committee of the Royal Irish Academy supported a study of Chironomidae on Clare Island and west County Mayo as part of the Academy's "New Survey of Clare Island" (Murray and Murray, 2003, 2006). A second project supported by the Heritage Council of Ireland was undertaken in 2005 to assemble distribution records of the then known Chironomidae of Ireland. Distribution data was sourced from published data and from records in his personal

collections since the mid 1960s, in "grey-literature" reports and in unpublished theses at University College Dublin from directed research with undergraduate and postgraduate M.Sc. and Ph.D. students. Other records were sourced from studies in University College Cork (Morgan, 1982), University of Ulster (McLarnon, 1997) and the National University of Ireland, Galway (Fahy, 2002). The resulting database on a CD-ROM, of over 12,000 records for 497 chironomid species, is lodged with the Heritage Council of Ireland, Kilkenny (Murray, 2006a).

Since the completion of these projects in 2006, additional countrywide distribution data has come from the senior author's personal collections and from his examination of over 110,000 chironomid pupal exuviae, collected between the years 2006 and 2009 at 209 locations from 193 lakes throughout Ireland by field research staff of the Environmental Protection Agency (EPA) (Plate 13). Those collections were undertaken for CPET analyses (**C**hironomid **P**upal **E**xuviae **T**echnique – Wilson and Ruse, 2005) as part of the Agency's Lakes Monitoring Programme under the EU Water Framework Directive. To provide the required information needed for water quality assessment by CPET analysis, pupal exuviae need only be identified to the level of genus, or selected species group. However, following that CPET analyses, a more detailed examination was undertaken of pupal exuviae retained from the EPA collections. With identification to species level, the collections yielded exceptionally useful information on the distribution of chironomid species throughout Ireland. In the first decade of the 21st century, records from Murray (2000b), Murray and Baars (2006a, 2006b), Murray and Murray (2003, 2006) and Trodd and Murray (2004) along with records in Northern Ireland from McLarnon and Carter (2000), Langton (2002, 2004a, b), Langton and Pinder (2007) and Langton and Ruse (2006), formed the basis of the checklist of 470 species in Chandler *et al*. (2008). Peter Langton's continued interest in faunal surveys, particularly from his ongoing study on pupal exuviae from the River Bann, has resulted in a significant increase in knowledge of the chironomid fauna in Northern Ireland, including descriptions of new species (Langton, 2013, 2015c) (Plate 14).

Additions to the Irish faunal listing in the present decade were given by Langton (2012a, b, 2015a, b), Murray (2007, 2010, 2012a, b, c, 2013, 2015a, b, 2016 a, b, c, 2017a, b, c), Murray and Ashe (2017) and Murray and O'Connor (2012). Distribution details of records of the known species-level taxa at over 1,100 locations in Ireland up to October 2015 were provided in the three-part publications of Murray *et al*. (2013, 2014, 2015) with an online version available at the National Biodiversity Data Centre (Murray, 2015c).

The current *version 2.6* of Fauna Europaea (Spies and Sæther, 2013) provides checklists for 1,273 species in the countries of the western Palaearctic Region and lists 468 species for the Republic of Ireland and 338 species for the separate political entity of Northern Ireland. Murray *et al*. (2016) corrected some inaccuracies in those listings

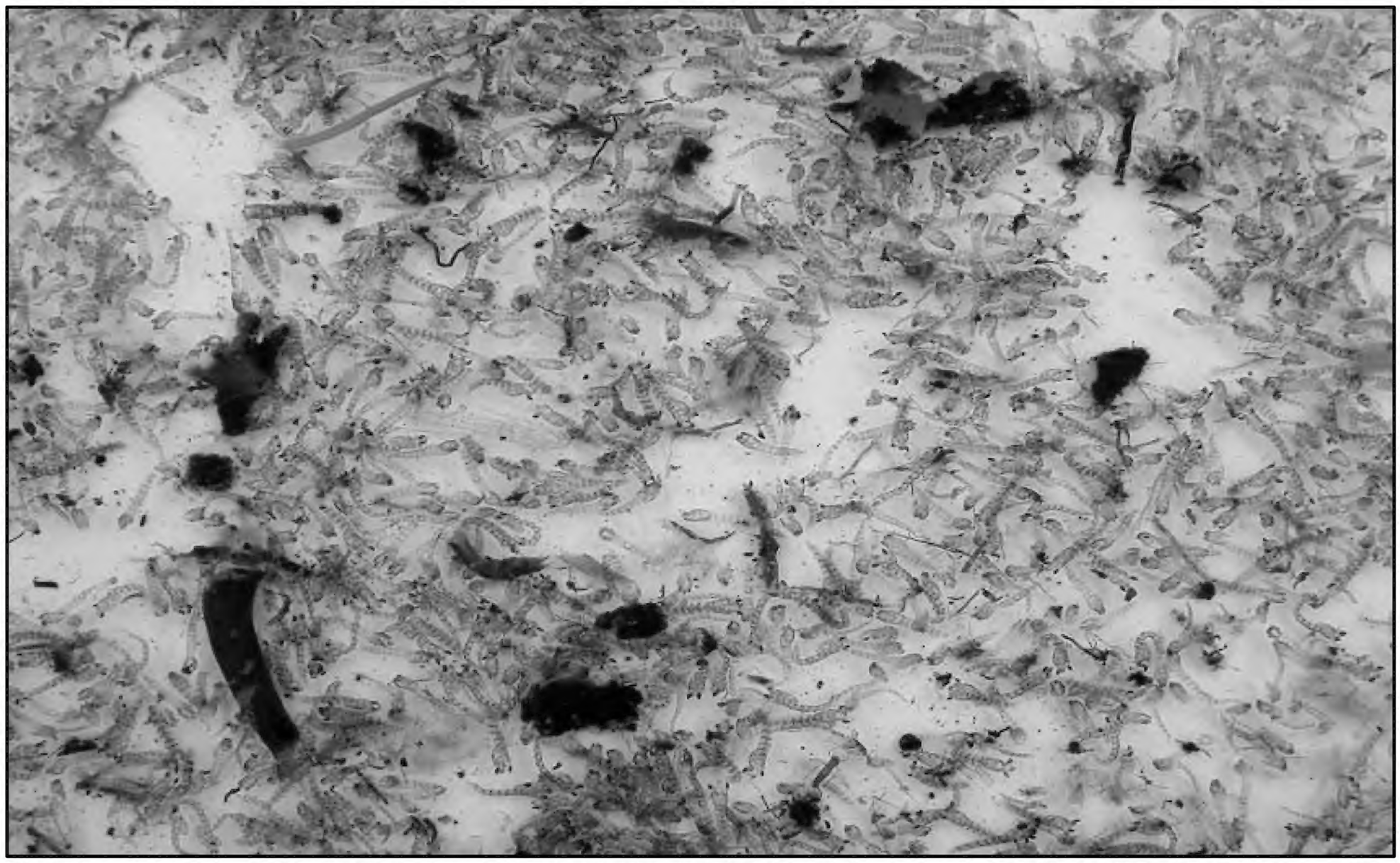


PLATE 13. Myriad pupal exuviae in a sample from Lough Acorrymor, County Mayo.

and gave updated numbers of 505 species for the Republic and 348 species for Northern Ireland with a total of 518 species for the island of Ireland. An additional 19 species-level taxa were then noted as unique morphotypes - including six undescribed species.

Faunal inventories and databases are constantly subject to change and require regular updating arising from taxonomic revisions and acquisition of new distribution records. At the end of the 19th century some 33 species were documented from Ireland. The number of species known from Ireland increased slightly through the early 20th century but increased markedly from 1970 to the present (Plate 15). At the end of the year 2017, there were 520 species on record and an additional 20 unique species-level taxa including six known, but as yet undescribed species, and 14 taxa recognised by their distinct pupal exuviae.

PLATE 14. Peter H. Langton. Northern Ireland's resident specialist on Chironomidae.

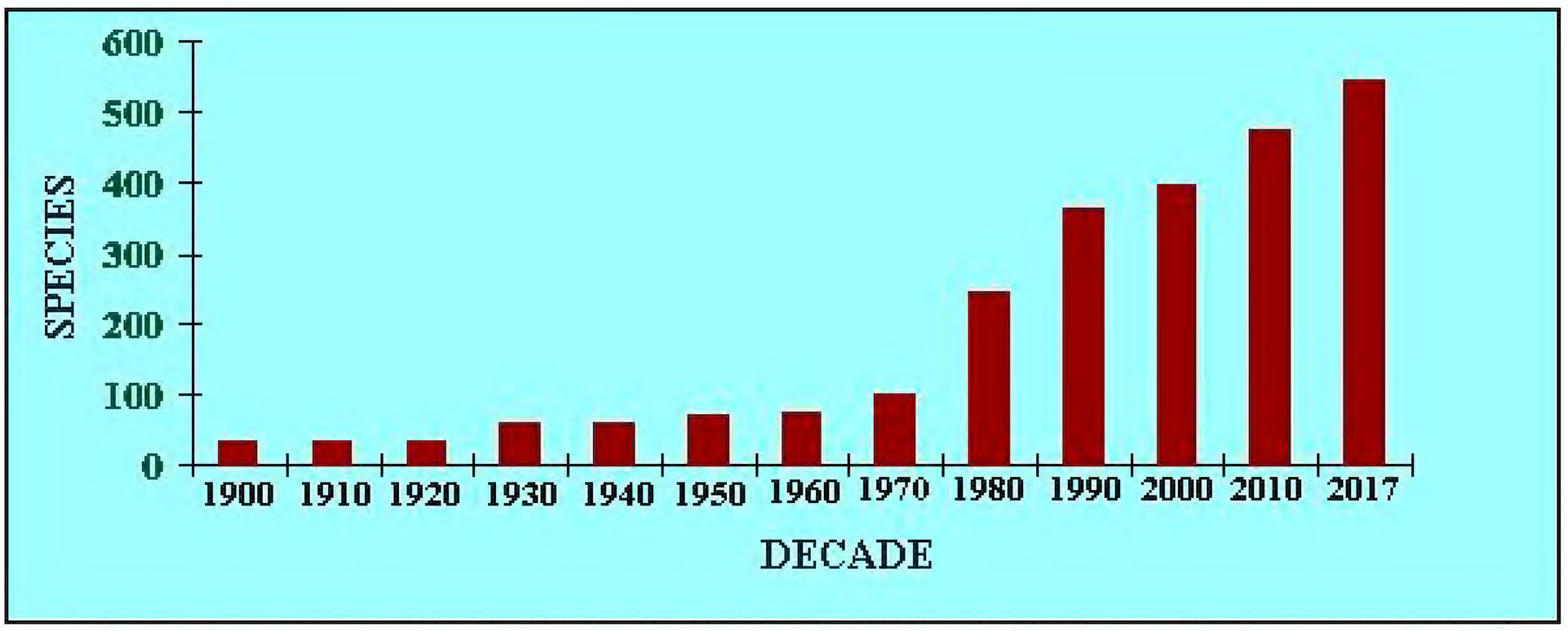


PLATE 15. Cumulative increase by decade in the number of species of Chironomidae recorded in Ireland between the years 1900 and 2017.

Subfamily representation of Chironomidae in Ireland

Eleven subfamilies are now recognised in the Family Chironomidae. Representatives of eight are documented by Spies and Sæther (2013) in the west Palaearctic (western continental Europe) including Britain and Ireland (Table 1). The majority of species belong to the subfamilies Orthocladiinae and Chironominae with appreciably fewer numbers of Tanypodinae and Diamesinae. The Podonominae, Prodiamesinae and Telmatogetoninae (predominantly marine) have a much lower representation. Only one extant species of Buchonomyiinae is known in the west Palaearctic.

TABLE 1. Number of species-level taxa in the eight subfamilies of Chironomidae currently known from Ireland (with additional unique pupal morphotypes and undescribed species in parentheses), Britain and western continental Europe.

Subfamily	Ireland	Britain	Europe
Buchonomyiinae	1	1	1
Podonominae	2	3	8
Tanypodinae	60 (4)	65	108
Diamesinae	11	16	72
Prodiamesinae	3	5	9
Telmatogetoninae	3	4	7
Orthocladiinae	217 (6)	253	592
Chironominae	223 (10)	261	476
Total species number	**520 (20)**	**608**	**1273**

Distribution of Chironomidae in Ireland

Basis of reporting chironomid species records

The Fauna Europaea database provides species records of Chironomidae documented by country. Apart from island countries, such as Iceland or Malta, the countries of the West Palaearctic European landmass are political constructs with land borders that imperceptibly merge, resulting in a shared biodiversity resource between countries. Since there are two political jurisdictions on the island of Ireland, Fauna Europaea provides records separately for the Republic of Ireland and Northern Ireland (as Great Britain – Northern Ireland). Traditionally faunal records for Ireland are reported on an all-island basis (e.g. Ashe *et al*., 1998; Bond *et al.,* 2006; Chandler *et al*., 2008; O'Connor, 2015). Since the juvenile stages of aquatic insects are restricted to habitats in discrete physical river basins (catchment areas) recent distribution data for Irish Chironomidae in Murray (2016a, b, c, 2017a, b, c), Murray and Ashe (2017) and Murray *et al.* (2013, 2014, 2015) have been given both by county **and** by physico-

graphic river catchment areas i.e. Hydrometric Areas. Summary data on the distribution of Ephemeroptera in Ireland by Kelly-Quinn and Bracken (2000) was similarly treated. There are 520 named species of Chironomidae now on record from Ireland with an additional 20 distinct morphotypes (six undescribed species and 14 pupal morphotypes) giving a total of 540 species-level taxa for the island. Thus far, 18 species are on record from Northern Ireland only while 198 taxa (179 species and 19 species level taxa) are known only from the Republic of Ireland. Records of 324 taxa (323 species and one species level taxon) are known from each jurisdiction. The numbers of taxa in each Province and County in Ireland treated in the present work are summarised in Table 2. Corresponding summary data for species on record in each Hydrometric Area of the eight major River Basin Districts of Ireland is given in Table 3.

TABLE 2. Number of species-level taxa of Chironomidae by Province and County in Ireland (including Rathlin Island and Clare Island). Total numbers are given for each Province (December, 2017).

Province	**County**	**Species**	**Province**	**County**	**Species**
Ulster	Antrim	178	**Leinster**	Carlow	55
	Rathlin Island	61		Dublin	147
	Armagh	23		Kildare	69
	Derry	275		Kilkenny	66
	Down	75		Laois	56
	Fermanagh	165		Longford	62
	Tyrone	76		Louth	22
	GB-NI	350		Meath	199
	Cavan	168		Offaly	95
	Donegal	319		Westmeath	136
	Monaghan	84		Wexford	115
	ROI	352		Wicklow	184
	TOTAL	**428**		**TOTAL**	**380**
Munster	Clare	253	**Connacht**	Galway	301
	Cork	234		Leitrim	157
	Limerick	80		Mayo	347
	Kerry	317		Clare Island	133
	Tipperary	112		Roscommon	175
	Waterford	95		Sligo	148
	TOTAL	**415**		**TOTAL**	**436**

TABLE 3. Number of species of Chironomidae in the forty Hydrometric Areas (HA) of Ireland with total species numbers for each of the eight River Basin Districts (RBD) and for the islands with existing records.

RBD	HA	Species	RBD	HA	Species
NW RBD	HA 1	143	**SW RBD**	HA 18	106
	HA 2	92		HA 19	114
	HA 36	232		HA 20	162
	HA 37	130		HA 21	168
	HA 38	258		HA 22	284
	HA 39	168		Total	**364**
	HA 40	61	**SH RBD**	HA 23	53
	Total	**372**		HA 24	40
NB RBD	HA 3	282		HA 25	229
	HA 6	63		HA 26	233
	Total	**298**		HA 27	174
NE RBD	HA 4	102		HA 28	122
	HA 5	66		Total	**350**
	Total	**131**	**W RBD**	HA 29	88
E RBD	HA 7	228		HA 30	235
	HA 8	85		HA 31	151
	HA 9	187		HA 32	285
	HA 10	161		HA 33	180
	Total	**351**		HA 34	180
SE RBD	HA 11	32		HA 35	188
	HA 12	109		Total	**410**
	HA 13	30	**ISLANDS**		
	HA 14	2		Rathlin	61
	HA 15	90		Tory	2
	HA 16	79		Clare	133
	HA 17	44		Inishmore	1
	Total	**207**		Inishtearaght	2

NW – North Western; NB – Neagh Bann; NE – North Eastern; E – Eastern; SE – South Eastern; SW – South Western; SH – Shannon; W – Western.

Records by counties

Counties are sub-national political divisions demarcating areas of local government that are grouped in four historic political regions termed provinces. There are nine counties in the ancient Province of Ulster in the north-east, north and north-west of the country. Six of these counties comprise Northern Ireland, part of the United Kingdom. The other three counties of Ulster are under the jurisdiction of the Republic of Ireland along with five counties in the Province of Connacht (west), twelve counties in the

Province of Leinster (east) and six counties in Munster (south and south-west) (Table 2, Plate 16).

A total of 428 species are on record in the Province of Ulster with 350 recognized in the six counties of Northern Ireland and 352 in the three counties of Ulster in the Republic of Ireland. County Donegal has 319 species, the greatest number of species recorded for any county in Ulster, documented largely but not exclusively from the mountainous area around the Glenveagh National Park. County Derry (Londonderry) in Northern Ireland has 275 species that have been documented through personal collections by P. H. Langton. A total of 436 species are on record in the province of Connacht, 347 in County Mayo, many of which were derived from studies associated with the Royal Irish Academy's New Survey of Clare Island, on the island and the adjacent mainland. Leinster has 380 species on record with 199 known from County Meath, the home county of the senior author. Proximity to Dublin (and University College Dublin) accounts for high numbers of species records in counties Dublin (147 species) and Wicklow (184 species) that include records from diverse habitats in the Dublin and Wicklow mountains. The 136 species on record in County Westmeath are largely from lakes in the county that have been extensively surveyed. There are 415 species on record in the Province of Munster and not surprisingly a greater number, 317 species, is known from County Kerry, largely from intensive studies the Killarney National Park and from investigations on the River Flesk during the Ph.D. studies by co-author Patrick Ashe (Ashe, 1982). It is noteworthy that counties and districts with the larger number of species records are those that have been the focus of concerted study.

Records by Hydrometric Area

Forty Hydrometric Areas are defined on the island of Ireland based on physical gradients of the landscape that are independent of political regions. (Plates 17, 20). Each hydrometric area comprises either a single river catchment or a group of smaller catchments. For water resource management purposes the hydrometric areas are combined into larger catchment regions or River Basin Districts (RBD) (see <www.epa.ie>). Records of aquatic insects documented by hydrometric area provide data that is independent of local county boundaries, or the international political boundary between Northern Ireland and the Republic of Ireland.

The highest number of species has thus far been documented from the Western River Basin District (RBD) where 410 species are on record (Table 3). Among the seven hydrometric areas in this RBD two, HA 30 and HA 32, have 235 and 285 species on record respectively, the latter having the highest number but only slightly greater than the 282 species on record in HA3 as part of the Neagh Bann RBD where a total of 298 species is known. Eight HAs have records of 200 species or more: HA 3 (282 species), HA7 (228 species), HA22 (284 species), HA 25 (229 species), HA 26 (233 species), HA30 (235 species), HA32 (285 species), HA36 (232 species) and HA

38 (258 species). As noted above for the county records, the hydrometric areas and River Basin Districts with the larger number of records are those that have been investigated more thoroughly. It is striking that HA 14 appears to be deficient in records due to lack of collection in this area.

PLATE 16. The Counties of Ireland, the international border (red) and offshore islands (numbers 1 to 5) with records of Chironomidae: 1 - Rathlin Island; 2 - Tory Island; 3 - Clare Island; 4 - Inishmore; 5 - Inishtearaght.

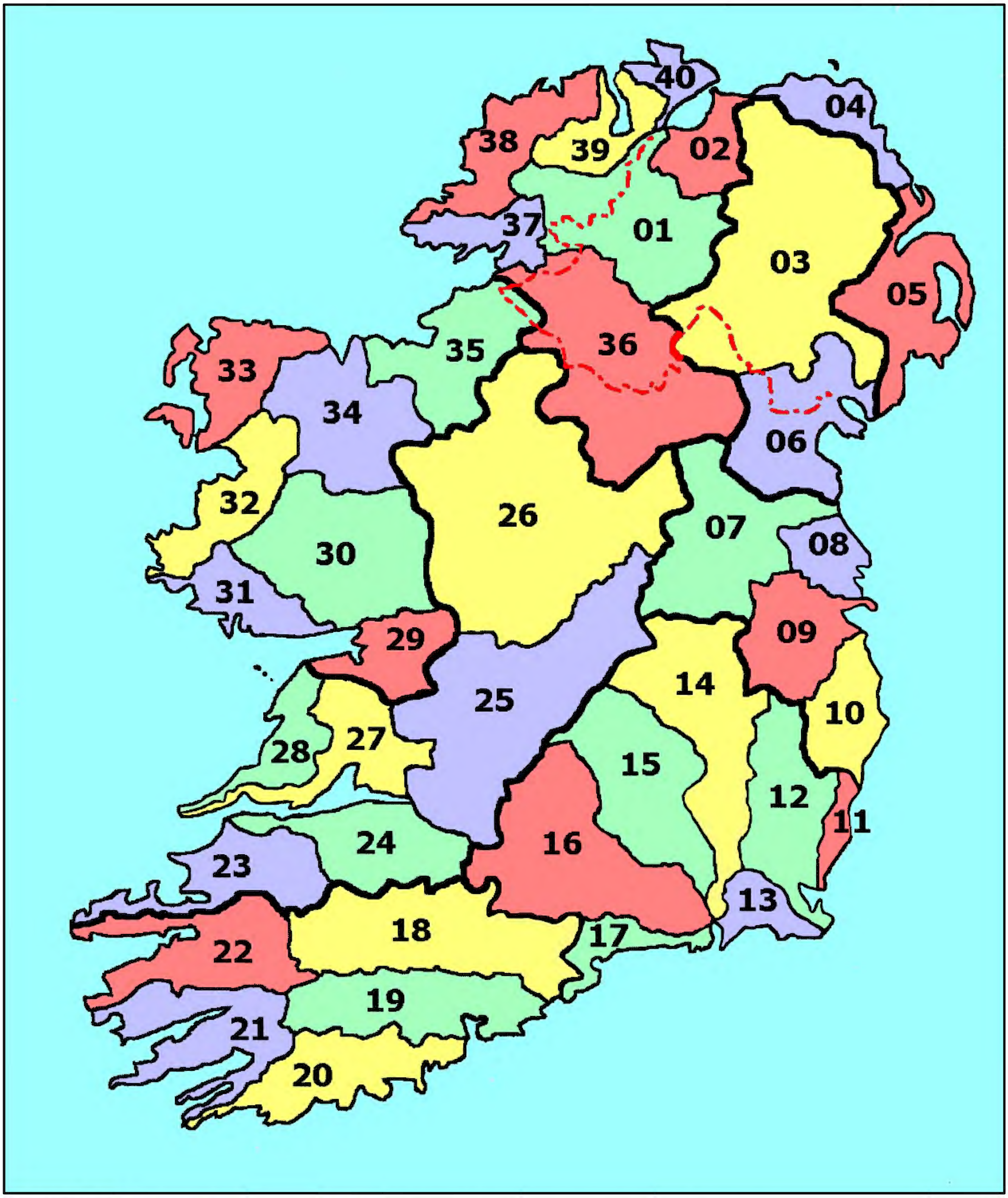


PLATE 17. The River Basin Districts (RBD) and 40 Hydrometric Areas of Ireland. [RBDs: North Western, HAs1 and 2 and 36-40; Neagh Bann, HAs 3 and 6; North Eastern, HAs 4 and 5: Eastern, HAs 7-10; South Eastern, HAs 11-17; South Western, HAs 18-22; Shannon, HAs 23-28; Western, HAs 29-35].

Checklist of Irish Chironomidae

A taxonomic checklist of Irish Chironomidae, including a number of species-level taxa recognised as distinct morphotype – as pupal exuviae (Pe) or as known but undescribed species, is given here for the species currently on record in Ireland and some offshore islands. The sequence of taxa follows Murray *et al*. (2013, 2014, 2015) where changes in nomenclature were adopted from taxonomic revisions at generic / subgeneric level by Andersen *et al.* (2013), Cranston and Epler (2013), Ekrem *et al.* (2010), Epler *et al.* (2013), Sæther (2004, 2005), Sæther and Ferrington (2003), Sæther *et al*. (2000), Spies (2005), Spies and Sæther (2004), Stur and Ekrem (2006), Rossaro and Casalengo (2001) and Rossaro *et al.* (2003). Some species are until now known from the Republic of Ireland (ROI) only, some only from Northern Ireland, United Kingdom (GB-NI), while others have been documented from both jurisdictions. Symbols placed after the species epithet are used to distinguish these different distribution categories. A "plus" symbol (+) indicates a species currently known from the Republic of Ireland only, an "asterisk" (*) indicates a species currently known from Northern Ireland only and the combined "plus and asterisk" symbols (+*) indicate species with records in both jurisdictions. Furthermore, a question mark (?) *following* the species name is used to indicate some uncertain species records that have been included for Northern Ireland (GB-NI) in Fauna Europaea (Spies and Sæther 2013), further details of which are given in Murray *et al*. (2016).

Subfamily BUCHONOMYIINAE Brundin & Sæther, 1978

BUCHONOMYIA Fittkau, 1955

thienemanni Fittkau, 1955 +

Subfamily PODONOMINAE Thienemann & Edwards, 1937

LASIODIAMESA Kieffer, 1924

sphagnicola (Kieffer, 1925) +

PAROCHLUS Enderlein, 1912

kiefferi (Garrett, 1925) +

Subfamily TANYPODINAE Kieffer, 1906

ABLABESMYIA Johannsen, 1905

Subgenus ***ABLABESMYIA*** Johannsen, 1905

longistyla Fittkau, 1962 +*

monilis (Linnaeus, 1758) +*

phatta (Egger, 1863) +*

ANATOPYNIA Johannsen, 1905

plumipes (Fries, 1823) +*

APSECTROTANYPUS Fittkau, 1962

trifascipennis (Zetterstedt, 1838) +
ARCTOPELOPIA Fittkau, 1962
barbitarsis (Zetterstedt, 1850) +*
griseipennis (van der Wulp, 1859) +*
melanosoma (Goetghebuer, 1933) +
CLINOTANYPUS Kieffer, 1913
Subgenus ***CLINOTANYPUS*** Kieffer, 1913
nervosus (Meigen, 1818) +*
CONCHAPELOPIA Fittkau, 1957
Subgenus ***CONCHAPELOPIA*** Fittkau, 1957
hittmairorum Michiels & Spies, 2002 +
melanops (Meigen, 1818) +*
pallidula (Meigen, 1818) +*
viator (Kieffer, 1911) +*
GUTTIPELOPIA Fittkau, 1962
guttipennis (van der Wulp, 1861) +
KRENOPELOPIA Fittkau, 1962
binotata (Wiedemann, 1817) +
nigropunctata (Staeger, 1839) +
LABRUNDINIA Fittkau, 1962
longipalpis (Goetghebuer, 1921) +
LARSIA Fittkau, 1962
atrocincta (Goetghebuer, 1942) +?
curticalcar (Kieffer, 1918) +
MACROPELOPIA Thienemann, 1916
Subgenus ***MACROPELOPIA*** Thienemann, 1916
adaucta Kieffer, 1916 +*
nebulosa (Meigen, 1804) +*
notata (Meigen, 1818) +?
"Pe 1" sensu Langton, 1991 +
"spec. Norwegen" sensu Fittkau, 1962 +
MONOPELOPIA Fittkau, 1962
Subgenus ***MONOPELOPIA*** Fittkau, 1962
tenuicalcar (Kieffer, 1918) +
NATARSIA Fittkau, 1962
nugax (Walker, 1856) +
punctata (Fabricius, 1805) +
NILOTANYPUS Fittkau, 1962
dubius (Meigen, 1804) +*
PARAMERINA Fittkau, 1962 - see under *Zavrelimyia*
PROCLADIUS Skuse, 1889

Subgenus ***HOLOTANYPUS*** Roback, 1982
choreus (Meigen, 1804) +*
crassinervis (Zetterstedt, 1838) +*
? = *culiciformis* (Linnaeus, 1767)
sagittalis (Kieffer, 1909) +*
signatus (Zetterstedt, 1850) +*
simplicistilus Freeman, 1948 +*
"near ***vesus*** Roback" sensu Langton, 1991 +
"Pe 4" sensu Langton, 1991 +
Subgenus ***PSILOTANYPUS*** Kieffer, 1906
flavifrons Edwards, 1929 +
lugens Kieffer, 1915 +
rufovittatus (van der Wulp, 1874) +*
PSECTROTANYPUS Kieffer, 1909
varius (Fabricius, 1787) +*
RHEOPELOPIA Fittkau, 1962
eximia (Edwards, 1929) +
maculipennis (Zetterstedt, 1838) +*
ornata (Meigen, 1838) +*
TANYPUS Meigen, 1803
Subgenus ***TANYPUS*** Meigen, 1803
kraatzi (Kieffer, 1912) +
punctipennis Meigen, 1818 +
vilipennis (Kieffer, 1918) +*
TELMATOPELOPIA Fittkau, 1962
nemorum (Goetghebuer, 1921) +
THIENEMANNIMYIA Fittkau, 1957
Subgenus ***THIENEMANNIMYIA*** Fittkau, 1957
carnea (Fabricius, 1805) +*
festiva (Meigen, 1838) *
fusciceps (Edwards, 1929) *
geijskesi (Goetghebuer, 1934) +*
laeta (Meigen, 1818) +
lentiginosa (Fries, 1823) +
northumbrica (Edwards, 1929) +*
pseudocarnea Murray, 1976 +*
Subgenus ***HAYESOMYIA*** Murray & Fittkau, 1986
tripunctata (Goetghebuer, 1922) +
TRISSOPELOPIA Kieffer, 1923
longimanus (Staeger, 1839) +*
XENOPELOPIA Fittkau, 1962

falcigera (Kieffer, 1911) +*
nigricans (Goetghebuer, 1927) +*
ZAVRELIMYIA Fittkau, 1962
Subgenus ***PARAMERINA*** Fittkau, 1962
cingulata (Walker, 1856) +*
divisa (Walker, 1856) +*
Subgenus ***ZAVRELIMYIA*** Fittkau, 1962
barbatipes (Kieffer, 1911) +*
hirtimanus (Kieffer, 1918) +
melanura (Meigen, 1804) +*
nubila (Meigen, 1830) +

Subfamily DIAMESINAE Kieffer, 1922
DIAMESA Meigen, 1835
bohemani Goetghebuer, 1932 *
cinerella Meigen, 1835 +
incallida (Walker, 1856) +
insignipes Kieffer, 1908 +*
permacra (Walker, 1856) +
tonsa (Haliday, 1856) +*
POTTHASTIA Kieffer, 1922
gaedii (Meigen, 1838) +*
longimanus Kieffer, 1922 +*
montium (Edwards, 1929) +
PROTANYPUS Kieffer, 1906
morio (Zetterstedt, 1838) +*
PSEUDODIAMESA Goetghebuer, 1939
branickii (Nowicki, 1873) +

Subfamily PRODIAMESINAE Sæther, 1976
MONODIAMESA Kieffer, 1922
bathyphila (Kieffer, 1918) +
ekmani Brundin, 1949 +*
PRODIAMESA Kieffer, 1906
olivacea (Meigen, 1818) +*

Subfamily TELMATOGETONINAE Wirth, 1949
TELMATOGETON Schiner, 1867
japonicus Tokunaga, 1933 +
murrayi Sæther, 2009 *
THALASSOMYA Schiner, 1856

frauenfeldi Schiner, 1856 +

Subfamily ORTHOCLADIINAE Kieffer, 1911

ACAMPTOCLADIUS Brundin, 1956

reissi Cranston & Sæther, 1982 +

submontanus (Edwards, 1932) +

ACRICOTOPUS Kieffer, 1921

lucens (Zetterstedt, 1850) +*

BRILLIA Kieffer, 1913

bifida (Kieffer, 1909) +*

longifurca Kieffer, 1921 +*

BRYOPHAENOCLADIUS Thienemann, 1934

aestivus (Brundin, 1947) +

femineus (Edwards, 1929) +*

furcatus (Kieffer, 1916) +

ictericus (Meigen, 1830) +

muscicola (Kieffer, 1906) +*

nitidicollis (Goetghebuer, 1913) +

simus (Edwards, 1929) +

subvernalis (Edwards, 1929) +*

vernalis (Goetghebuer, 1921) +

xanthogyne (Edwards, 1929) +

CAMPTOCLADIUS van der Wulp, 1874

stercorarius (De Geer, 1776) +*

CARDIOCLADIUS Kieffer, 1912

capucinus (Zetterstedt, 1850) +*

fuscus Kieffer, 1924 +*

CHAETOCLADIUS Kieffer, 1911

dentiforceps (Edwards, 1929) +

dissipatus (Edwards, 1929) +

insolitus Caspers, 1987 *

melaleucus (Meigen, 1818) +*

perennis (Meigen, 1830) +*

piger (Goetghebuer, 1913) +

suecicus (Kieffer, 1916) *

CLUNIO Haliday, 1855

marinus Haliday, 1855 +

CORYNONEURA Winnertz, 1846

arctica Kieffer, 1923 +*

carriana Edwards, 1924 +*

celeripes Winnertz, 1852 +?

celtica Edwards, 1924 +*
coronata Edwards, 1924 +
edwardsi Brundin, 1949 +*
gratias Schlee, 1968 +*
lacustris Edwards, 1924 +*
lobata Edwards, 1924 +*
scutellata Winnertz, 1846 +*
"Pe 2a" sensu Langton, 1991 +
CORYNONEURELLA Brundin, 1949
paludosa Brundin, 1949 +?
CRICOTOPUS van der Wulp, 1874
Subgenus ***CRICOTOPUS*** van der Wulp, 1874
albiforceps (Kieffer, 1916) +*
algarum (Kieffer, 1911) +
annulator Goetghebuer, 1927 +*
bicinctus (Meigen, 1818) +*
curtus Hirvenoja, 1973 +*
cylindraceus (Kieffer, 1908) +
ephippium (Zetterstedt, 1838) +
festivellus (Kieffer, 1906) +*
flavocinctus (Kieffer, 1924) +*
fuscus (Kieffer, 1909) +*
pallidipes Edwards, 1929 +?
pilosellus Brundin, 1956 +*
polaris Kieffer, 1926 +*
pulchripes Verrall, 1912 +*
similis Goetghebuer, 1921 +*
tibialis (Meigen, 1804) +
tremulus (Linnaeus, 1758) +*
triannulatus (Macquart, 1826) +*
trifascia Edwards, 1929 +*
tristis Hirvenoja, 1973 +
"pe16" sensu Langton & Visser, 2003 +
Subgenus ***ISOCLADIUS*** Kieffer, 1909
brevipalpis Kieffer, 1909 +
intersectus (Staeger, 1839) +*
laricomalis Edwards, 1932 +?
obnixus (Walker, 1856) +?
ornatus (Meigen, 1818) +
pilitarsis (Zetterstedt, 1850) +
reversus Hirvenoja, 1973 +*

speciosus Goetghebuer, 1921 +
sylvestris (Fabricius, 1794) +*
tricinctus (Meigen, 1818) +*
trifasciatus (Meigen, 1810) +*
"Pe 2" sensu Langton, 1991 +
? = *relucens* Hirvenoja, 1973
"Pe 5" sensu Langton, 1991 +
Subgenus ***NOSTOCOCLADIUS*** Ashe & Murray, 1980
lygropis Edwards, 1929 +
Subgenus ***PARATRICHOCLADIUS*** Santos Abreu, 1918
rufiventris (Meigen, 1830) +*
skirwithensis (Edwards, 1929) +*
spiesi (Ashe & O'Connor, 2012) *
= *nigritus* (Goetghebuer, 1938)
DIPLOCLADIUS Kieffer, 1908
cultriger Kieffer, 1908 +*
EPOICOCLADIUS Šulc & Zavřel, 1924
ephemerae (Kieffer, 1924) +
EUKIEFFERIELLA Thienemann, 1926
ancyla Svensson, 1986 +*
brevicalcar (Kieffer, 1911) +*
claripennis (Lundbeck, 1898) +*
clypeata (Thienemann, 1919) +*
coerulescens (Kieffer, 1926) +*
cyanea Thienemann, 1936 +
devonica (Edwards, 1929) +*
dittmari Lehmann, 1972 +*
gracei (Edwards, 1929) +
ilkleyensis (Edwards, 1929) +*
minor (Edwards, 1929) +*
tirolensis Goetghebuer, 1938 +*
EURYCNEMUS van der Wulp, 1874
crassipes (Meigen, 1810) +
GEORTHOCLADIUS Strenzke, 1941
Subgenus ***GEORTHOCLADIUS*** Strenzke, 1941
luteicornis (Goetghebuer, 1941) +
GYMNOMETRIOCNEMUS Edwards, 1932
Subgenus ***GYMNOMETRIOCNEMUS*** Edwards, 1932
subnudus (Edwards, 1929) +
Subgenus ***RAPHIDOCLADIUS*** Sæther, 1983
brumalis (Edwards, 1929) +*

HALOCLADIUS Hirvenoja, 1973
Subgenus ***HALOCLADIUS*** Hirvenoja, 1973
fucicola (Edwards, 1926) +
variabilis (Staeger, 1839) +*
varians (Staeger, 1839) +*
Subgenus ***PSAMMOCLADIUS*** Hirvenoja, 1973
braunsi (Goetghebuer, 1942) +*
HELENIELLA Gowin, 1943
ornaticollis (Edwards, 1929) +*
HETEROTANYTARSUS Spärck, 1923
apicalis (Kieffer, 1921) +*
HETEROTRISSOCLADIUS Spärck, 1923
grimshawi (Edwards, 1929) +
marcidus (Walker, 1856) +*
HYDROSMITTIA Ferrington & Sæther, 2011
oxoniana (Edwards, 1922) +
= *recta* (Edwards, 1929)
KRENOSMITTIA Thienemann & Krüger, 1939
camptophleps (Edwards, 1929) +*
LIMNOPHYES Eaton, 1875
angelicae Sæther, 1990 +*
asquamatus Andersen, 1937 +*
= *smolandicus* Brundin, 1947
difficilis Brundin, 1947 *
edwardsi Sæther, 1990 +*
gurgicola (Edwards, 1929) +*
habilis (Walker, 1856) +*
= *truncorum* (Goetghebuer, 1921)
minimus (Meigen, 1818) +*
natalensis (Kieffer, 1914) +*
ninae Sæther, 1975 *
pentaplastus (Kieffer, 1921) +*
platystylus Murray, 2007 +
pumilio (Holmgren, 1869) +*
= *globifer* (Lundström, 1915)
spinigus Sæther, 1990 +*
MESOSMITTIA Brundin, 1956
flexuella (Edwards, 1929) +
METRIOCNEMUS van der Wulp, 1874
Subgenus ***INERMIPUPA*** Langton & Cobo, 1997
carmencitabertarum Langton & Cobo, 1997 +*

Subgenus ***METRIOCNEMUS*** van der Wulp, 1874
albolineatus (Meigen, 1818) +*
alisonae Langton, 2013 *
atriclava Kieffer, 1921 +
beringensis (Cranston & Oliver, 1988) +
cavicola Kieffer, 1921 +*
ephemerus Langton, 2015 +*
eurynotus (Holmgren, 1883) +*
fuscipes (Meigen, 1818) +*
inopinatus Strenzke, 1950 +
picipes (Meigen, 1818) +*
terrester Pagast, Thienemann & Krüger, 1941 +
tristellus Edwards, 1929 +*
ursinus (Holmgren, 1869) +*
NANOCLADIUS Kieffer, 1913
balticus (Palmén, 1959) +*
dichromus (Kieffer, 1906) +*
rectinervis (Kieffer, 1911) +*
ORTHOCLADIUS van der Wulp, 1874
Subgenus ***EUDACTYLOCLADIUS*** Thienemann, 1935
fuscimanus (Kieffer, 1908) +*
olivaceus (Kieffer, 1911) +
Subgenus ***EUORTHOCLADIUS*** Thienemann, 1935
ashei Soponis, 1990 +*
rivicola Kieffer, 1911 +*
rivulorum Kieffer, 1909 +*
thienemanni Kieffer, 1906 +*
Subgenus ***MESORTHOCLADIUS*** Sæther, 2005
frigidus (Zetterstedt, 1838) +*
Subgenus ***ORTHOCLADIUS*** van der Wulp, 1874
dentifer Brundin, 1947 +*
glabripennis (Goetghebuer, 1921) +*
oblidens (Walker, 1856) +*
pedestris Kieffer, 1909 +*
rhyacobius Kieffer, 1911 +*
nec *obumbratus* Johannsen, 1905
rivinus Potthast, 1914 +*
rubicundus (Meigen, 1818) +*
wetterensis Brundin, 1956 +
Subgenus ***POGONOCLADIUS*** Brundin, 1956
consobrinus (Holmgren, 1869) +*

Subgenus ***SYMPOSIOCLADIUS*** Cranston, 1982
holsatus Goetghebuer, 1937 +
lignicola Kieffer, 1914 +
ruffoi Rossaro & Prato, 1991 +*
PARACLADIUS Hirvenoja, 1973
conversus (Walker, 1856) +*
PARAKIEFFERIELLA Thienemann, 1936
bathophila (Kieffer, 1912) +*
coronata (Edwards, 1929) +
fennica Tuiskunen, 1986 +
scandica Brundin, 1947 +*
smolandica (Brundin, 1947) +*
"sp 1" sensu Reiss, 1968; "Pe 1" Langton, 1991 +
PARALIMNOPHYES Brundin, 1956
longiseta (Thienemann, 1919) +
PARAMETRIOCNEMUS Goetghebuer, 1932
stylatus (Spärck, 1923) +*
PARAPHAENOCLADIUS Thienemann, 1924
exagitans subsp. ***monticola*** Strenzke, 1950 +*
impensus subsp. ***impensus*** (Walker, 1856) +*
irritus subsp. ***irritus*** (Walker, 1856) +
penerasus (Edwards, 1929) +*
pseudirritus subsp. ***pseudirritus*** Strenzke, 1950 +*
PARATRISSOCLADIUS Zavřel, 1937
excerptus subsp. ***excerptus*** (Walker, 1856) +*
PSECTROCLADIUS Kieffer, 1906
Subgenus ***ALLOPSECTROCLADIUS*** Wülker, 1956
obvius (Walker, 1856) +*
platypus (Edwards, 1929) +*
Subgenus ***MESOPSECTROCLADIUS*** Laville, 1972
barbatipes Kieffer, 1923 +*
Subgenus ***MONOPSECTROCLADIUS*** Wülker, 1956
calcaratus (Edwards, 1929) +
Subgenus ***PSECTROCLADIUS*** Kieffer, 1906
barbimanus (Edwards, 1929) +*
bisetus Goetghebuer, 1942+*
fennicus Storå, 1939+*
limbatellus (Holmgren, 1869) +*
octomaculatus Wülker, 1956 +
oligosetus Wülker, 1956 +?
oxyura Langton, 1985 +*

psilopterus (Kieffer, 1906) +*
schlienzi Wülker, 1956 +
sordidellus (Zetterstedt, 1838) +*
ventricosus Kieffer, 1925 +
"sp. A" sensu Langton, 1980+*
PSEUDORTHOCLADIUS Goetghebuer, 1943
Subgenus ***PSEUDORTHOCLADIUS*** Goetghebuer, 1943
curtistylus (Goetghebuer, 1921) +*
filiformis (Kieffer, 1908) +*
macrovirgatus Sæther & Sublette, 1983 +*
rectangilobus Caspers & Siebert, 1980 +*
PSEUDOSMITTIA Edwards, 1932
albipennis (Goetghebuer, 1921) +*
angusta (Edwards, 1929) +
obtusa Strenzke, 1960 *
trilobata (Edwards, 1929) +
RHEOCRICOTOPUS Brundin, 1956
Subgenus ***PSILOCRICOTOPUS*** Sæther, 1986
atripes (Kieffer, 1913) +*
chalybeatus subsp. ***chalybeatus*** (Edwards, 1929) +*
glabricollis (Meigen, 1830) +
tirolus Lehmann, 1969 +
Subgenus ***RHEOCRICOTOPUS*** Brundin, 1956
effusus (Walker, 1856) +*
fuscipes (Kieffer, 1909) +*
RHEOSMITTIA Brundin, 1986
spinicornis (Brundin, 1956) +
SMITTIA Holmgren, 1869
amoena Caspers, 1988 *
aterrima (Meigen, 1818) +*
contingens (Walker, 1856) +*
edwardsi Goetghebuer, 1932 +*
leucopogon (Meigen, 1804) +*
nudipennis (Goetghebuer, 1913) +
pratorum (Goetghebuer, 1927) +*
superata Goetghebuer, 1939 *
SYNORTHOCLADIUS Thienemann, 1935
semivirens (Kieffer, 1909) +*
THALASSOSMITTIA Strenzke & Remmert, 1957
thalassophila (Bequaert & Goetghebuer, 1914) +*
THIENEMANNIA Kieffer, 1909

gracilis Kieffer, 1909 +
THIENEMANNIELLIA Kieffer, 1911
acuticornis (Kieffer, 1912) +*
clavicornis (Kieffer, 1911) +
flavescens (Edwards, 1929) +
majuscula (Edwards, 1924) +
obscura Brundin, 1947 *
vittata (Edwards, 1924) +*
TRISSOCLADIUS Kieffer, 1908
brevipalpis Kieffer, 1908 +
TVETENIA Kieffer, 1922
bavarica (Goetghebuer, 1934) +*
calvescens (Edwards, 1929) +*
discoloripes (Goetghebuer & Thienemann, 1936) +*
verralli (Edwards, 1929) +*
ZALUTSCHIA Lipina, 1939
humphriesiae Dowling & Murray, 1980 +
Subfamily CHIRONOMINAE Newman, 1834
Tribe Chironomini Newman, 1834
BAEOTENDIPES Kieffer, 1913
noctivagus (Kieffer, 1911) +
BENTHALIA Lipina, 1939
carbonaria (Meigen, 1804) +*
CHIRONOMUS Meigen, 1803
Subgenus ***CHIRONOMUS*** Meigen, 1803
alpestris Goetghebuer, 1934 +*
= *dorsalis* auct. sensu Strenzke, 1959
annularius Meigen, 1818 +*
anthracinus Zetterstedt, 1860 +*
aprilinus Meigen, 1818 +*
bernensis Klötzli, 1973 +*
cingulatus Meigen, 1830 +*
commutatus Keyl, 1960 +*
lacunarius Wülker, 1973 +
longistylus Goetghebuer, 1921 +*
lugubris Zetterstedt, 1850 +*
luridus Strenzke, 1959 +*
nuditarsis Keyl, 1961 +*
nudiventris Ryser, Scholl & Wülker, 1983 +*
obtusidens Goetghebuer, 1921 +*
pallidivittatus Edwards, 1929 +*

piger Strenzke, 1956 +*
pilicornis (Fabricius, 1787) +*
plumosus (Linnaeus, 1758) +*
prasinus Meigen sensu Pinder, 1978 +?
pseudothummi Strenzke, 1959 +*
riparius Meigen, 1804 +*
salinarius Kieffer, 1915 +?
tentans Fabricius, 1805 +*
"sp. A" sensu Pinder, 1978 +
Subgenus ***LOBOCHIRONOMUS*** Ryser, Wülker & Scholl, 1985
dorsalis Meigen, 1818 +
CLADOPELMA Kieffer, 1921
bicarinatum (Brundin, 1947) +
goetghebueri Spies & Sæther, 2004 +
= *laterale* Goetghebuer,1934
krusemani (Goetghebuer, 1935) +*
virescens (Meigen, 1818) +
viridulum (Linnaeus, 1767) +*
CRYPTOCHIRONOMUS Kieffer, 1918
Subgenus ***CRYPTOCHIRONOMUS*** Kieffer, 1918
albofasciatus (Staeger, 1839) +*
defectus (Kieffer, 1913) +*
denticulatus (Goetghebuer, 1921) +*
obreptans (Walker, 1856) +*
psittacinus (Meigen, 1830) +*
redekei (Kruseman, 1933) +
rostratus Kieffer, 1921 +*
supplicans (Meigen, 1830) +*
"Pe 1" sensu Langton, 1984 +
CRYPTOTENDIPES Beck & Beck, 1969
pflugfelderi Reiss, 1964 +
pseudotener (Goetghebuer, 1922) +
usmaensis (Pagast, 1931) +
DEMEIJEREA Kruseman, 1933
rufipes (Linnaeus, 1761) +*
DEMICRYPTOCHIRONOMUS Lenz, 1941
Subgenus ***DEMICRYPTOCHIRONOMUS*** Lenz, 1941
vulneratus (Zetterstedt, 1838) +*
"Pe 1" sensu Langton, 1991 +
Subgenus ***IRMAKIA*** Reiss, 1988
neglectus Reiss, 1988 +

DICROTENDIPES Kieffer, 1913
lobiger (Kieffer, 1921) +*
nervosus (Staeger, 1839) +*
notatus (Meigen, 1818) +*
pallidicornis (Goetghebuer, 1934) +
pulsus (Walker, 1856) +*
tritomus (Kieffer, 1916) +?
EINFELDIA Kieffer, 1924
pagana (Meigen, 1838) +
ENDOCHIRONOMUS Kieffer, 1918
albipennis (Meigen, 1830) +*
tendens (Fabricius, 1775) +*
GLYPTOTENDIPES Kieffer, 1913
Subgenus ***CAULOCHIRONOMUS*** Heyn, 1993
foliicola Kieffer sensu Pinder, 1978 +*
scirpi (Kieffer, 1915) +*
viridis (Macquart, 1834) +
Subgenus ***GLYPTOTENDIPES*** Kieffer, 1913
barbipes (Staeger, 1839) +*
cauliginellus (Kieffer, 1913) +*
glaucus (Meigen, 1818) +*
pallens (Meigen, 1804) +*
paripes (Edwards, 1929) +*
Subgenus ***HEYNOTENDIPES*** Spies & Sæther, 2004
signatus (Kieffer, 1909) +
GRACEUS Goetghebuer, 1928
ambiguus Goetghebuer, 1928 +
HARNISCHIA Kieffer, 1921
curtilamellata (Malloch, 1915) +*
fuscimanus Kieffer, 1921 +
KIEFFERULUS Goetghebuer, 1922
tendipediformis (Goetghebuer, 1921) +*
LAUTERBORNIELLA Thienemann & Bause, 1913
agrayloides (Kieffer, 1911) +*
MICROCHIRONOMUS Kieffer, 1918
deribae (Freeman, 1957) +
tener (Kieffer, 1918) +*
MICROTENDIPES Kieffer, 1915
britteni (Edwards, 1929) +*
chloris (Meigen, 1818) +*

confinis (Meigen, 1830) +*
diffinis (Edwards, 1929) +*
nitidus (Meigen, 1818) +*
pedellus (De Geer, 1776) +*
rydalensis (Edwards, 1929) +*
tarsalis (Walker, 1856) +
NILOTHAUMA Kieffer, 1921
brayi (Goetghebuer, 1921) +*
NUBENSIA Spies, 2015
nubens (Edwards, 1929) +*
OMISUS Townes, 1945
caledonicus (Edwards, 1932) +
PAGASTIELLA Brundin, 1949
orophila (Edwards, 1929) +*
PARACHIRONOMUS Lenz, 1921
cinctellus (Goetghebuer, 1921) +*
danicus Lehmann, 1970 +
digitalis (Edwards, 1929) *
frequens (Johannsen, 1905) +*
gracilior (Kieffer, 1918) +*
mauricii (Kruseman, 1933) +?
monochromus (van der Wulp, 1875) +?
parilis (Walker, 1856) +
subalpinus (Goetghebuer, 1932) +
tenuicaudatus (Malloch, 1915) +
varus (Goetghebuer, 1921) +
vitiosus (Goetghebuer, 1921) +*
"Pe 2" sensu Langton, 1984 +*
"pe2a" sensu Langton & Visser, 2003 +
"Pe 3" sensu Langton, 1984 +
"Pe 4" sensu Langton, 1991 +
"? *Parachironomus* sp. Pe" sensu Langton, 1991 +
PARACLADOPELMA Harnisch, 1923
camptolabis (Kieffer, 1913) +*
laminatum (Kieffer, 1921) +*
nigritulum (Goetghebuer, 1942) +?
PARALAUTERBORNIELLA Lenz, 1941
nigrohalteralis (Malloch, 1915) +*
PARATENDIPES Kieffer, 1911
albimanus (Meigen, 1818) +*
nudisquama (Edwards, 1929) +

plebeius (Meigen, 1818) +
PHAENOPSECTRA Kieffer, 1921
flavipes (Meigen, 1818) +*
punctipes (Wiedemann, 1817) +
"Pe f. Bala" sensu Langton, 1991+
POLYPEDILUM Kieffer, 1912
Subgenus ***PENTAPEDILUM*** Kieffer, 1913
sordens (van der Wulp, 1875) +*
tritum (Walker, 1856) +
uncinatum Goetghebuer, 1921 +
Subgenus ***POLYPEDILUM*** Kieffer, 1912
acutum Kieffer, 1915 +
albicorne (Meigen, 1838) +*
arundineti (Goetghebuer, 1921) +*
laetum (Meigen, 1818) +*
nubeculosum (Meigen, 1804) +*
pedestre (Meigen, 1830) +*
Subgenus ***TRIPODURA*** Townes, 1945
aegyptium Kieffer, 1925 +*
bicrenatum Kieffer, 1921 +*
pullum (Zetterstedt, 1838) +*
quadriguttatum Kieffer, 1921 +
scalaenum (Schrank, 1803) +*
Subgenus ***URESIPEDILUM*** Oyewo & Sæther, 1998
convictum (Walker, 1856) +*
cultellatum Goetghebuer, 1931 +*
SÆTHERIA Jackson, 1977
reissi Jackson, 1977 +
SERGENTIA Kieffer, 1922
coracina (Zetterstedt, 1850) +
STENOCHIRONOMUS Kieffer, 1919
Subgenus ***STENOCHIRONOMUS*** Kieffer, 1919
gibbus (Fabricius, 1794) +*
"Pe 2" sensu Langton, 1984 +
? Subgenus (uncertain)
hibernicus (Edwards, 1929) +
STICTOCHIRONOMUS Kieffer, 1919
maculipennis (Meigen, 1818) +*
pictulus (Meigen, 1830) +*
rosenscholdi (Zetterstedt, 1838) +
sticticus (Fabricius, 1781) +*

SYNENDOTENDIPES Grodhaus, 1987
dispar (Meigen, 1830) +*
impar (Walker, 1856) +*
TRIBELOS Townes, 1945
intextum (Walker, 1856) +*
XENOCHIRONOMUS Kieffer, 1921
xenolabis (Kieffer, 1916) +*

Tribe Pseudochironomini Sæther, 1977
PSEUDOCHIRONOMUS Malloch, 1915
prasinatus (Staeger, 1839) +*

Tribe Tanytarsini Zavřel, 1917
CLADOTANYTARSUS Kieffer, 1921
atridorsum Kieffer, 1924 +*
difficilis Brundin, 1947 +?
iucundus Hirvenoja, 1962 +
lepidocalcar Krüger, 1938 +
mancus (Walker, 1856) +*
nigrovittatus (Goetghebuer, 1922) +*
pallidus Kieffer, 1922 +*
vanderwulpi (Edwards, 1929) +*
CORYNOCERA Zetterstedt, 1837
ambigua Zetterstedt, 1837 +*
MICROPSECTRA Kieffer, 1909
apposita (Walker, 1856) +*
= *contracta* Reiss, 1965
aristata Pinder, 1976 +
atrofasciata (Kieffer, 1911) +*
attenuata Reiss, 1969 +
junci (Meigen, 1818) +*
lindebergi Säwedal, 1976 +*
lindrothi Goetghebuer, 1931 +*
logani (Johannsen, 1928)
= *groenlandica* Andersen, 1937 +*
nana (Meigen, 1818) +
notescens (Walker, 1856) +*
pallidula (Meigen, 1830) +*
= *bidentata* (Goetghebuer) sensu Pinder, 1978
roseiventris (Kieffer, 1909) +*
uliginosa (Reiss, 1969) +

NEOZAVRELIA Goetghebuer & Thienemann, 1941
cuneipennis (Edwards, 1929) +
luteola Goetghebuer & Thienemann, 1941 +
PARATANYTARSUS Thienemann & Bause, 1913
austriacus (Kieffer, 1924) +*
bituberculatus (Edwards, 1929) +
brevicalcar Kieffer, 1909 +
dimorphis Reiss, 1965 +
dissimilis (Johannsen, 1905) +*
grimmii (Schneider, 1885) +*
inopertus (Walker, 1856) +*
laccophilus (Edwards, 1929) +
laetipes (Zetterstedt, 1850) +
lauterborni (Kieffer, 1909) +*
penicillatus (Goetghebuer, 1928) +
tenellulus (Goetghebuer, 1921) +*
tenuis (Meigen, 1830) +*
RHEOTANYTARSUS Thienemann & Bause, 1913
curtistylus (Goetghebuer, 1921) +*
muscicola Thienemann, 1929 *
nigricauda Fittkau, 1960 +
pellucidus (Walker, 1848) +*
pentapoda (Kieffer, 1909) +*
photophilus (Goetghebuer, 1921) +*
reissi Lehmann, 1970 +
rhenanus Klink, 1983 +*
rioensis Langton & Armitage, 1995 +
STEMPELLINA Thienemann & Bause, 1913
almi Brundin, 1947 +
bausei (Kieffer, 1911) +*
STEMPELLINELLA Brundin, 1947
brevis (Edwards, 1929) +?
edwardsi Spies & Sæther, 2004 +*
reissi Casas & Vilchez-Quero, 1991 +*
TANYTARSUS van der Wulp, 1874
aberrans Lindeberg, 1970 +
anderseni Reiss & Fittkau, 1971 *
bathophilus Kieffer, 1911 +*
brundini Lindeberg, 1963 +*
buchonius Reiss & Fittkau, 1971 +*
chinyensis Goetghebuer, 1934 +*

curticornis Kieffer, 1911 +*
debilis (Meigen, 1830) +*
dibranchius Kieffer, 1926 +
= *separabilis* Brundin, 1947
ejuncidus (Walker, 1856) +*
eminulus (Walker, 1856) +*
excavatus Edwards, 1929 +
gibbosiceps Kieffer, 1922 +
glabrescens Edwards, 1929 +*
gracilentus (Holmgren, 1883) +
gregarius Kieffer, 1909 +*
heusdensis Goetghebuer, 1923 +*
inaequalis Goetghebuer, 1921 +?
lactescens Edwards, 1929 +
lestagei Goetghebuer, 1922 +*
= *decipiens* Lindeberg, 1967
= *palmeni* Lindeberg, 1967
longitarsis Kieffer, 1911 +*
lugens (Kieffer, 1916) +*
medius Reiss & Fittkau, 1971 +
mendax Kieffer, 1925 +*
= *holochlorus* Edwards, 1929
miriforceps (Kieffer, 1921) *
nemorosus Edwards, 1929 +
niger Andersen, 1937 +*
palettaris Verneaux, 1969 +
pallidicornis (Walker, 1856) +*
quadridentatus Brundin, 1947 +
recurvatus Brundin, 1947 +?
signatus (van der Wulp, 1859) +
striatulus Lindeberg, 1976 +
sylvaticus (van der Wulp, 1859) +*
telmaticus Lindeberg, 1959 +*
= *simulans* Lindeberg, 1967
usmaensis Pagast, 1931 +*
verralli Goetghebuer, 1928 +*
VIRGATANYTARSUS Pinder, 1982
arduennensis (Goetghebuer, 1922) +*
triangularis (Goetghebuer, 1928) +?
ZAVRELIA Kieffer, Thienemann & Bause, 1913
pentatoma Kieffer & Bause, 1913 +?

Atlas of Irish Chironomidae and their distribution in Europe
Guide to presentation format

Data on the distribution of Chironomid species in Ireland follows the same family, genus and subgenus sequence as in the checklist above. Species and morphotypes (if any) known from Ireland are listed directly under the each genus heading. Details of collections - date(s), locations and Counties, Hydrometric Areas, and Irish Grid References for species records prior to November 2015 have been given in Murray *et al*. (2013, 2014, 2015). Records later than 2015 by Murray (2016a, b, c, 2017a, b) and Murray and Ashe (2017) are indicated by the superscript symbol "$" with a footnote to indicate the relevant publication that gives details of collection and distribution. Maps (Figures 1 to 1040) depicting the known Irish and European distributions are provided for each species using the format adopted by O'Connor (2015). Maps of Ireland indicate the boundary between the Republic of Ireland and Northern Ireland. The information presented for Ireland is based on 22,468 records of Chironomidae from collections made up to December 2017 at 1,247 locations, including sites on some small off-shore islands. Locations of the distribution records for Ireland are plotted in 10km x 10km Irish grid squares on the latitude and longitude grid. There are 1,019 such 10km grid squares on the areal landmass of the island of Ireland and currently records of Chironomidae are documented from collections in 460 of those squares (Plate 18). The known distribution patterns for Europe are illustrated by country, based largely on Spies and Sæther (2013) with the addition of some recent species records from the British Isles (Murray, 2015b, 2016c).

The text format for species distribution information is flexibly structured because of variation in available information. Species known from Ireland are listed directly under the genus heading and general comments on the biology of species in some genera are given. Symbols are used, as in the checklist, to indicate species thus far known from the Republic of Ireland only (+), Northern Ireland only (*) or those with records in both jurisdictions (+*). Doubtful species records for Northern Ireland are indicated by a question mark (?). The current status of individual species in Ireland is indicated by citing a) the number of locations from which records have been documented, b) the Hydrometric Area(s) (HAs 1-40, Plate 17 and 19) and c) the county or counties (Plate 16 and 19) for those records. Hydrometric areas are only defined for the island of Ireland and, consequently, the five offshore islands, from which species records are reported here, are treated as discrete geographical entities. The number(s) of locations for records on these islands is indicated separately for: Clare Island (situated off the west coast, in Clew Bay in the administrative region of County Mayo); Rathlin Island (lying off the north-east coast in the administrative region of County Antrim); Tory Island (lying off the north-west coast in the administrative region of County Donegal); Inishmore, one of the Aran Islands (situated in Galway Bay in the administrative region of County Galway) and

Inishtearaght (lying off the south-east coast in the administrative region of County Kerry). Data from Clare Island and Rathlin Island is more extensive; the former from studies by the senior author during the New Survey of Clare Island promoted by the Royal Irish Academy; the latter from personal studies by P. H. Langton.

Disparities in distribution or frequency of occurrence of some species may reflect varying sampling effort rather than regional differences in abundance or distribution. Some records are derived from single site visits whereas records in other areas come from more detailed surveys. Arbitrary abundance category rankings of rare, common or widespread are used with the caveat that existing knowledge is incomplete and subject to change with future biogeographical / biodiversity studies. Comments on the distribution of some species in Ireland and in Europe, including Iceland, based on data in Fauna Europaea are also given.

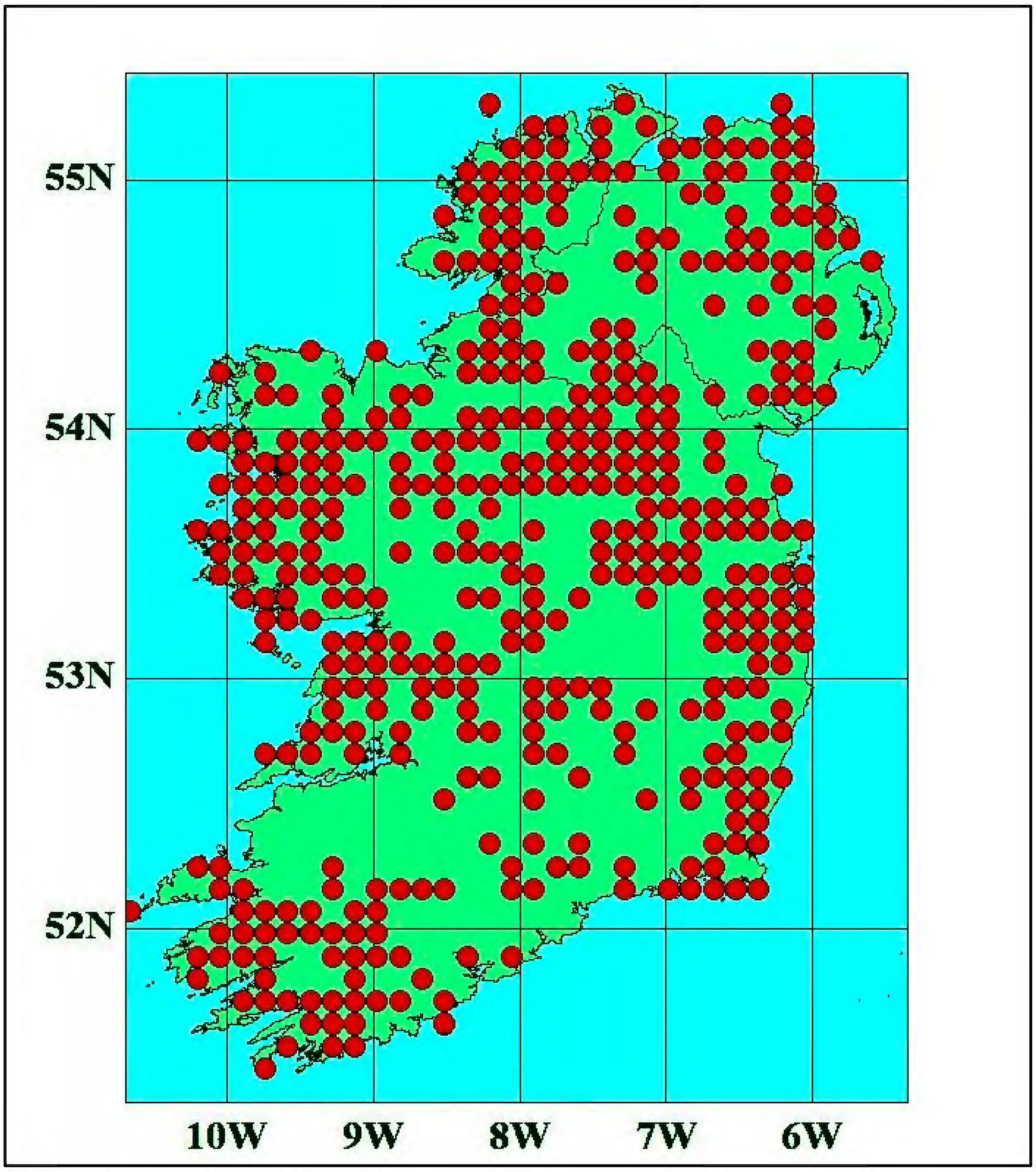


PLATE 18. Map of Ireland showing locations of sites of chironomid species records.

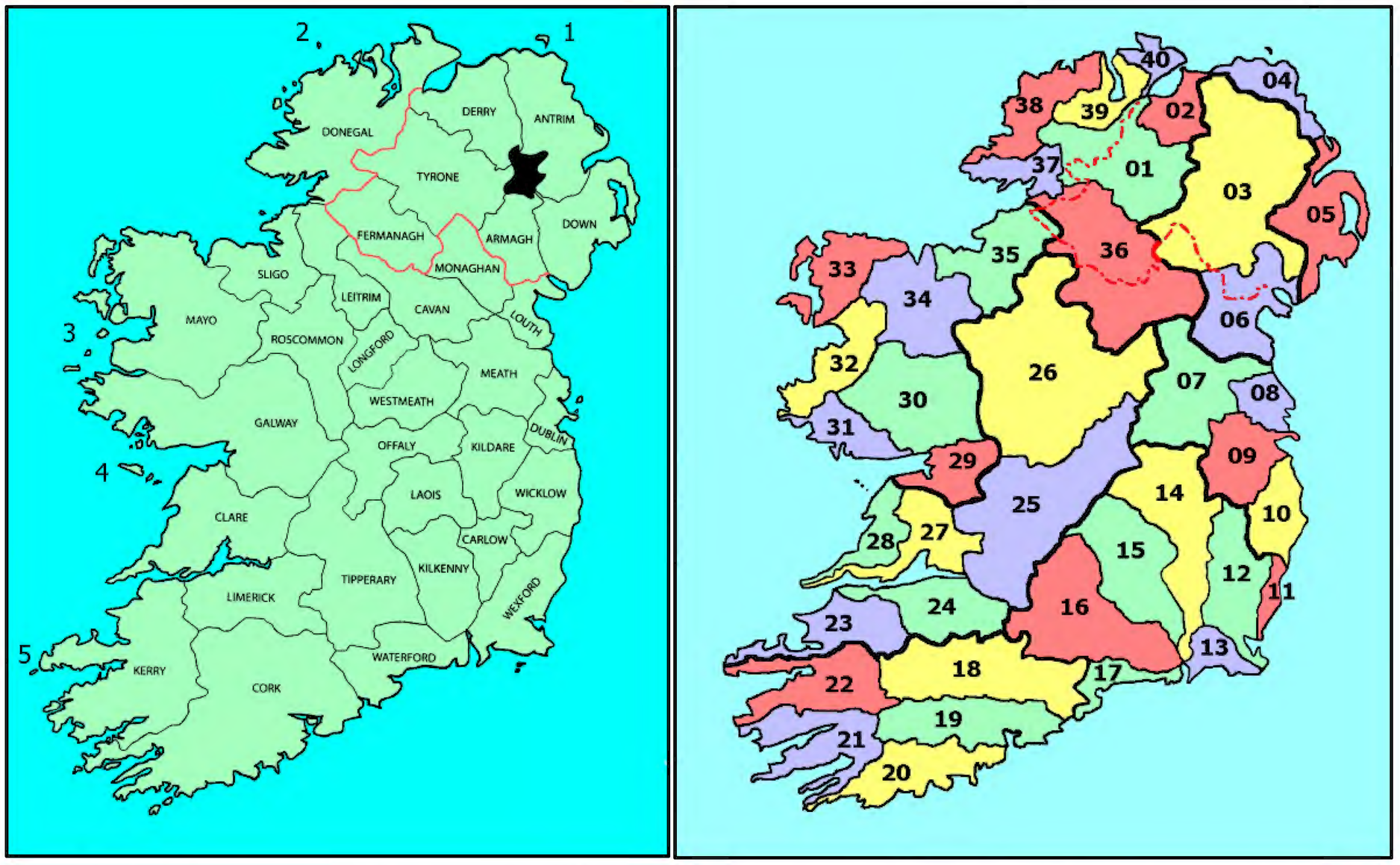


PLATE 19. Counties, Islands [1 - Rathlin Island; 2 - Tory Island; 3 - Clare Island; 4 - Inishmore; 5 - Inishtearaght] and Hydrometric Areas of Ireland (these maps are shown at a larger scale as Plates 16 and 17).

The species and their distributions

Subfamily BUCHONOMYIINAE Brundin & Sæther, 1978

BUCHONOMYIA Fittkau, 1955

Buchonomyia thienemanni Fittkau, 1955 +

The subfamily Buchonomyiinae was erected by Brundin and Sæther (1978) based on the genus *Buchonomyia* with three included extant species: *B. thienemanni* from the west Palaearctic Region, *B. burmanica* Brundin and Sæther from northern Burma (now Myanmar) in the Oriental Region and a then known but undescribed species from Costa Rica in the Neotropical Region that was later described as *B. brundini* by Andersen and Sæther (1995). A fossil species from Baltic amber, *B. succinea*, was described by Seredszus and Wichard (2003) for the Palaearctic Region. The genus was originally established by Fittkau (1955) for *B. thienemanni* based on a slightly damaged adult male specimen he had collected in August 1953 from the Wasserkuppe region of the River Fulda, Germany. This remained the only record of the species until swarming adult males were collected in Ireland in July 1974 beside the River Flesk, near Killarney, County Kerry (Murray, 1976b). Mature pupae as well as pharate adult males and females were later found in drift net collections from the same location in July 1976. Descriptions of pupal exuviae and the adult female were given by Murray and Ashe (1981a, 1986), the egg-mass and eggs by Ashe and Murray (1983), while the larva was later described by Ashe (1986, 1995).

The phylogenetic placement of the subfamily Buchonomyiinae has had a chequered history (Cranston *et al*., 2012). When Brundin and Sæther (1978) conferred subfamily status on the genus, they argued, based on "underlying synapomorphies", for placement of the Buchonomyiinae in the clade of subfamilies Buchonomyiinae + Diamesinae + Prodiamesinae + Chironominae + Orthocladiinae (the semifamily Chironomoinae). However, Murray and Ashe (1981a, 1986) challenged that viewpoint and asserted misinterpretation of morphological character states in both the male and female genital morphology by Brundin and Sæther (1978). Murray and Ashe (*op. cit*.) made a case for an alternative placement in the more pleisiomorphous (ancestral) group of subfamilies Buchonomyiinae + Tanypodinae + Podonominae + Aphroteniinae (semifamily Tanypodoinae). Disagreement continued as its position within the Chironomoinae was maintained by Sæther (1983, 1989), Andersen and Sæther (1995) and again by Sæther (2000). Resolution came when Cranston *et al*. (2012), demonstrated a phylogeny, based on molecular character analyses (including specimens of *B. thienemanni* that Peter Cranston collected with the senior author from the River Flesk in 2003 (endpieces - Plate 21), that excluded the subfamily Buchonomyiinae from the semifamily Chironomoinae and placed it as the sister group ancestral to all remaining subfamilies that originated in the mid to late Triassic Era - a position conforming more to that adopted by Murray and Ashe (1981, 1986).

***Buchonomyia thienemanni* Fittkau, 1955 +**

Known Irish and European distributions - Figures 1 and 2.

Status in Ireland: records from 16 locations in seven HAs (9, 12, 15, 18, 22, 33, 34) in Counties Carlow, Cork, Kerry, Kildare, Kilkenny, Mayo and Waterford. There are no records from Northern Ireland.

Comments: *Buchonomyia thienemanni* is known from rivers in the east, south, south-west and west of Ireland but it is not yet recorded from the north-west or north-east (Northern Ireland). Use of drift nets to collect pupal exuviae for faunal inventory studies resulted in a marked increase in distribution records in Europe. The species is now on record in western, central and southern Europe, the Czech Republic and European Russia (Ashe *et al*., 2015a, b). It was reported from Iran by Dowling (1980) and from North Africa (Morocco) by Kettani *et al*. (2010).

Ashe and O'Connor (2002) postulated that larvae of *B. thienemanni* were ectoparasitic on trichopteran larvae/pre-pupae while Ashe *et al*. (2015b) suggested that the trichopteran host species could be *Psychomyia pusilla* (Fabricius). Subfossil pupal remains have also been found in sediments of extinct river channels in the Netherlands and Germany (Ashe *et al*., 2015b). The species can be expected to occur elsewhere in the western Palaearctic, including Portugal, eastern Europe, the Balkans, South European Russia, the Caucuses, Turkey, and parts of the Middle and Near East. The recent record from a river near Moscow (Ashe *et al*., 2015b) confirms that the

immature stages can survive low winter temperatures and therefore its discovery in southern Fennoscandia would not be unexpected.

Subfamily PODONOMINAE Thienemann & Edwards, 1937

LASIODIAMESA Kieffer, 1924

Lasiodiamesa sphagnicola (Kieffer, 1925) +

Four species of *Lasiodiamesa* are known from the western Palaearctic, one of which is on record from Ireland, Great Britain and some European countries.

Lasiodiamesa sphagnicola (Kieffer, 1925) +

Known Irish and European distributions - Figures 3 and 4.

Status in Ireland: two records from a single location in HA25, County Offaly.

Comments: larvae of *Lasiodiamesa sphagnicola* live in bog waters in high latitude regions of Fennoscandia but are restricted to *Sphagnum* bogs at lower latitudes in Middle Europe (Sæther and Andersen, 2013). This species is known in Europe from Ireland, Great Britain, Norway, Sweden, Faroe Islands, Finland, Estonia, North and Central European Russia, Germany and Poland. The record from Clara Bog in the Irish midlands (Ashe, 1987) was from a shallow pool that had copious *Sphagnum* growth on the surface, near a stand of Birch trees (*Betula pubescens* Ehrenberg). It is likely to occur in other Irish boglands. There are no records thus far from Northern Ireland.

PAROCHLUS Enderlein, 1912

Parochlus kiefferi (Garrett, 1925) +

The genus *Parochlus* is the most widespread and species rich genus of Podonominae. While 48 species are known worldwide, mostly from the Neotropical and Australasian zoogeographical regions (Ashe and O'Connor, 2009), only one species, that also occurs in Ireland, is known from the western Palaearctic Region.

Parochlus kiefferi (Garrett, 1925) +

Known Irish and European distributions - Figures 5 and 6.

Status in Ireland: there are five records of *Parochlus kiefferi* from four locations in three HAs (9, 10, 38) in Counties Donegal, Dublin and Wicklow.

Comments: larvae of *P. kiefferi* are cold-stenothermal and are predominantly found in moss in small cool springs and streams at higher altitudes and latitudes where they feed on diatoms and algal detritus. C. F. Humphries collected larvae and pupae in 1950 from the headwaters of the River Dodder in the Dublin Mountains but the record was not published and remained unknown. While reviewing the Humphries' slide collections 30 years later the senior author discovered the slide-mounted specimens and the record was then published (Murray and Ashe, 1982). Additional records from County Wicklow and from the north-west of the country in the mountains of the Glenveagh National Park, County Donegal, were given by Murray (2012b). There are

no records thus far from Northern Ireland. The species is known from Great Britain (Scotland) and is widely distributed in northern latitudes of the western Palaearctic from the Faroe Islands and Iceland and on mainland Europe from Fennoscandia, Poland and the alpine regions of Italy, Austria and Germany.

Subfamily TANYPODINAE Kieffer, 1906

ABLABESMYIA Johannsen, 1905

Ablabesmyia (*Ablabesmyia*) *longistyla* Fittkau, 1962 +*

Ablabesmyia (*Ablabesmyia*) *monilis* (Linnaeus, 1758) +*

Ablabesmyia (*Ablabesmyia*) *phatta* (Egger, 1863) +*

Larvae of *Ablabesmyia* are eurytopic and inhabit a variety of standing and flowing waters in tropical, temperate and subarctic zones. Four subgenera are currently recognised in *Ablabesmyia* of which the nominal subgenus *Ablabesmyia,* with some 42 species recognised worldwide (Ashe and O'Connor, 2009), is the most speciose. Twelve species of *Ablabesmyia* sensu stricto are known in the Palaearctic, six of which are documented in the western Palaearctic (Spies and Sæther, 2013).

Subgenus *ABLABESMYIA* Johannsen, 1905

Three of the six known western Palaearctic species in the subgenus *Ablabesmyia* are on record in Ireland. Two, *A.* (*A.*) *longistyla* and *A.* (*A.*) *monilis,* are widespread while *A. phatta* has been less frequently recorded.

All three species are widespread throughout most of Europe. Gaps in the known distributions in countries of northern, central and southern Europe, for which records currently do not exist, are likely to be filled from future collection effort.

Ablabesmyia (*Ablabesmyia*) *longistyla* Fittkau, 1962+*

Known Irish and European distributions - Figures 7 and 8.

Status in Ireland: records from 187 locations, two on Clare Island, one on Rathlin Island and 184 in 27 HAs (1, 2, 3, 7, 10, 12, 17, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39 in Counties Antrim (Rathlin Island only), Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kilkenny, Leitrim, Limerick, Mayo, Meath, Monaghan, Roscommon, Sligo, Waterford, Westmeath, Wexford and Wicklow.

Ablabesmyia (*Ablabesmyia*) *monilis* (Linnaeus, 1758) +*

Known Irish and European distributions - Figures 9 and 10.

Status in Ireland: records from 272 locations, five on Clare Island, three on Rathlin Island and 264 in 32 HAs (1, 2, 3, 4, 7, 9, 10, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

Comments: *Ablabesmyia* (*Ablabesmyia*) *monilis* is the most frequently encountered *Ablabesmyia* species in Ireland except in the south-east of the country. Records are predominantly from lakes and ponds with a few records in rivers and streams.

Ablabesmyia* (*Ablabesmyia*) *phatta* (Egger, 1863) +

Known Irish and European distributions - Figures 11 and 12.

Status in Ireland: records from 88 locations, one each on Clare Island and Rathlin Island and 86 in 26 HAs (1, 3, 7, 9, 10, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38) in Counties Antrim (Rathlin Island only), Cavan, Clare, Cork, Derry, Donegal, Dublin, Galway, Kerry, Limerick, Mayo, Meath, Roscommon, Sligo, Waterford, Westmeath, Wexford and Wicklow.

ANATOPYNIA Johannsen, 1905

Anatopynia plumipes (Fries, 1823) +*

This is a monotypic genus with one species known from the Palaearctic Region that is also on record from Ireland. Larvae occur in standing waters (small lakes and ponds). In the Netherlands, larvae have been found in medium-sized stagnant water bodies, such as ditches and small lakes in meadows, marshes and bogs (Vallendunk and Moller-Pillot, 2007).

Anatopynia plumipes* (Fries, 1823) +

Known Irish and European distributions - Figures 13 and 14.

Status in Ireland: records exist from ten locations in nine HAs (3, 5, 9, 26, 27, 29, $30, 36, 37) in Counties Antrim, Cavan, Clare, Derry, Donegal, Kildare and $Mayo. [$Murray and Ashe, 2017].

Comments: *Anatopynia plumipes* was first recorded in Ireland in March 1977 (Murray and Ashe, 1983). The subsequent few records are from scattered locations in the northern two-thirds of the island, in Northern Ireland and the Republic of Ireland. It was first recorded from Great Britain in Grampian, Scotland in 2000 (Langton, 2004b). It is quite widely distributed in Europe but is not known from France, Portugal, Italy or eastern and southern Europe. Its occurrence in several Balkan countries indicates that it is likely to be more widespread, perhaps confined to suitable habitats at higher altitudes.

APSECTROTANYPUS Fittkau, 1962

Apsectrotanypus trifascipennis (Zetterstedt, 1838) +

Two species are known in the Palaearctic Region, one each in the east and west Palaearctic – the latter of which is recorded in Ireland.

***Apsectrotanypus trifascipennis* (Zetterstedt, 1838) +**

Known Irish and European distributions - Figures 15 and 16.

Status in Ireland: records from 26 locations in ten HAs (6, 9, 16, 25, 26, 29, 30, 32, 35, 36) in Counties Clare, Dublin, Galway, Leitrim, Longford, Mayo, Monaghan, Roscommon, Tipperary and Westmeath.
Comments: records of *Apsectrotanypus trifascipennis* in Ireland are mostly from central regions of the country. To date there are no records from Northern Ireland or from the south-west, south-east and north-east regions of the Republic of Ireland, although it is likely to occur there also. The species is widespread in Europe but with significant gaps in its known distribution, particularly in parts of southern Europe. It is likely that future faunal collection effort will yield records from those countries.

ARCTOPELOPIA Fittkau, 1962

Arctopelopia barbitarsis (Zetterstedt, 1850) +*
Arctopelopia griseipennis (van der Wulp, 1859) +*
Arctopelopia melanosoma (Goetghebuer, 1933) +

Arctopelopia larvae are characteristic of the littoral zone of oligotrophic lakes and pools. Three of the four known *Arctopelopia* species occur in the western Palaearctic Region. All three are on record from Ireland, two of the which, *A. barbitarsis* and *A. griseipennis*, are common except in the south-east of the country which is mostly devoid of suitable lake habitats. There is a single record of *A. melanosoma* from the Republic of Ireland only - in the Killarney area in the south-west.

Arctopelopia barbitarsis (Zetterstedt, 1850) +*

Known Irish and European distributions - Figures 17 and 18.
Status in Ireland: records from 43 locations, two on Clare Island and 41 in 19 HAs (3, 7, 10, 18, 19, 20, 21, 25, 26, 27, 28, 29, 30, 31, 32, 34, 36, 38, 40) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Mayo, Roscommon, Tipperary, Westmeath and Wicklow.
Comments: records of *Arctopelopia barbitarsis* are predominantly from lakes and it is a common species in Ireland, except in the south-east of the country. The species is known from Iceland and several countries in northern and central Europe while there are fewer records from southern Europe and no records from the Iberian Peninsula or Italy. It is likely to be more widespread in the western Palaearctic, including southern Europe, where it may be expected to occur in cooler waters of mountain regions.

Arctopelopia griseipennis (van der Wulp, 1859) +*

Known Irish and European distributions - Figures 19 and 20.
Status in Ireland: records from 66 locations, three on Clare Island, four on Rathlin Island and 59 in 20 HAs (1, 3, 7, 10, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 38) in Counties Antrim, Clare, Cork, Derry, Donegal, Galway, Kerry, Mayo, Meath, Offaly, Roscommon, Westmeath and Wicklow.
Comments: records of *Arctopelopia griseipennis* from lakes, ponds and rivers in Ireland are more numerous than those of *A. barbitarsis* but there are no records from

the south-east of the country. *A. griseipennis* has an European distribution comparable to *A. barbitarsis* and is also known from Iceland and northern and central Europe with fewer records from southern Europe. It is not on record from Spain, Portugal or Italy. However, it is likely to be more widespread in the western Palaearctic and in the cooler waters of mountain regions of southern Europe.

***Arctopelopia melanosoma* (Goetghebuer, 1933) +**

Known Irish and European distributions - Figures 21 and 22.

Status in Ireland: record from one location in HA22 in County Kerry.

Comments: the single Irish record of *Arctopelopia melanosoma* is from Lough Leane, Killarney, County Kerry in south-west Ireland. The species has a somewhat restricted European distribution. It is known from northern lakes in Great Britain and in Norway, Finland, Sweden, Denmark, Germany and Austria - its discovery in Iceland and other parts of northern and central Europe would not be unexpected.

***CLINOTANYPUS* Kieffer, 1913**

Clinotanypus (*Clinotanypus*) *nervosus* (Meigen, 1818) +*

Larvae of *Clinotanypus* live in soft sediments in small shallow lakes and in slow-flowing sections of rivers and streams. Forty four species in two subgenera are recognised. One species only is known from the Nearctic Region (in the subgenus *Aponteus* Roback) while 43 species are currently recognised in the subgenus *Clinotanypus* worldwide. Only two of these species have a western Palaearctic distribution one of which is known from Ireland.

Subgenus *CLINOTANYPUS* Kieffer, 1913

Clinotanypus* (*Clinotanypus*) *nervosus* (Meigen, 1818) +

Known Irish and European distributions - Figures 23 and 24.

Status in Ireland: records from 37 locations, three on Rathlin Island and 34 in 16 HAs (3, 6, 7, 17, 20, 22, 24, 25, 26, 27, 29, 30, 31, 32, 34, 36) in Counties Antrim (Rathlin Island only) Cavan, Clare, Cork, Derry, Fermanagh, Galway, Kerry, Limerick, Mayo, Meath, Monaghan, Offaly, Roscommon, Waterford, Westmeath and Wicklow.

Comments: Irish records of *Clinotanypus* (*Clinotanypus*) *nevosus* are mostly restricted to small lakes in the north-west, west and south-west of the country. There is a single record in the south-east from Belle Lake, County Waterford. *C.* (*C.*) *nervosus* is known from most countries of northern and central Europe but is not yet recorded from Belarus, Kaliningrad, Latvia, Liechtenstein, Luxembourg or Iceland. There are other significant gaps in its distribution further south but its occurrence on Corsica and in several Balkan countries suggests that it is likely to occur in most countries of southern Europe from Iberia to Greece.

CONCHAPELOPIA Fittkau, 1957

Conchapelopia (*Conchapelopia*) *hittmairorum* Michiels & Spies, 2002 +
Conchapelopia (*Conchapelopia*) *melanops* (Meigen, 1818) +*
Conchapelopia (*Conchapelopia*) *pallidula* (Meigen, 1818) +*
Conchapelopia (*Conchapelopia*) *viator* (Kieffer, 1911) +*

Conchapelopia larvae occupy a variety of habitats in rivers, streams, shallow ponds and in the littoral zone of lakes. Two subgenera *Conchapelopia* Fittkau and *Helopelopia* Roback are recognised (Cranston and Epler, 2013). Eight species of *Conchapelopia* (*Conchapelopia*) are known from the western Palaearctic, four of which are on record in Ireland.

Subgenus *CONCHAPELOPIA* Fittkau, 1957

Three of the four species of *Conchapelopia* known in Ireland, *C.* (*C.*) *hittmairorum*, *C.* (*C.*) *melanops* and *C.* (*C.*) *pallidula*, are found in Great Britain as well as parts of northern, central and southern Europe. *Conchapelopia* (*C.*) *hittmairorum* is not yet recorded in Northern Ireland. All three are likely to be found throughout Europe (with the possible exception of Iceland). The fourth Irish species, *C.* (*C.*) *viator*, also known from Great Britain, appears to be restricted to central and southern Europe and until now has not been recorded from the northernmost areas including Iceland, Norway, Sweden, Finland, the Baltic States or northern Russia.

Conchapelopia (*Conchapelopia*) *hittmairorum* Michiels & Spies, 2002 +

Known Irish and European distribution - Figures 25 and 26.

Status in Ireland: sporadic records from 14 locations in nine HAs (7, 10, 12, 18, 22, 25, 26, 30, 40) in Counties Carlow, Clare, Donegal, Galway, Kerry, Mayo, Meath, Roscommon, Waterford, Wexford and Wicklow. It has not been recorded from Northern Ireland.

Comments: although *Conchapelopia* (*Conchapelopia*) *hittmairorum* was described in 2002 (Michiels and Spies, 2002), its characteristic pupal exuviae had been recognized since the 1980s (Langton, 1984). Exuviae were first collected in Ireland in 1973 in drift net samples from the River Flesk, Killarney, County Kerry (Murray, 2006b).

Conchapelopia (*Conchapelopia*) *melanops* (Meigen, 1818) +*

Known Irish and European distributions - Figures 27 and 28.

Status in Ireland: records from 99 Locations in 27 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 20, 21, 22, 23, 25, 26, 27, 30, 32, 33, 34, 35, 36, 38) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Westmeath, Wexford and Wicklow.

Conchapelopia (*Conchapelopia*) *pallidula* (Meigen, 1818) +*

Known Irish and European distributions - Figures 29 and 30.

Status in Ireland: records from 73 locations in 26 HAs (1, 2, 3, 4, 7, 8, 9, 10, 12, 15, 18, 20, 22, 25, 26, 27, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Cork,

Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Laois, Leitrim, Mayo, Meath, Offaly, Sligo, Tyrone, Westmeath, Wexford and Wicklow.

Conchapelopia* (*Conchapelopia*) *viator* (Kieffer, 1911) +

Known Irish and European distributions - Figures 31 and 32.

Status in Ireland: records from 69 locations in 18 HAs (3, 7, 9, 10,12, 18, 20, 22, 26, 28, 30, 31, 32, 34, 35, 36, 37, 38) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Kildare, Leitrim, Mayo, Meath, Roscommon, Sligo, Wexford and Wicklow.

GUTTIPELOPIA Fittkau, 1962

Guttipelopia guttipennis (van der Wulp, 1861) +

Larvae of *Guttipelopia* live in lentic waters of lakes, ponds, ditches, bog pools associated with *Sphagnum* and occasionally in slow flowing water (Vallenduuk and Moller-Pillot, 2007). One species, known from the western Palaearctic occurs in Ireland.

***Guttipelopia guttipennis* (van der Wulp, 1861) +**

Known Irish and European distributions - Figures 33 and 34.

Status in Ireland: records from three locations in three HAs ([$]12, 16 and 22) in Counties Kerry, Waterford and [$]Wexford. [[$]Murray, 2017a].

Comments: this sole European species of the genus is known from the south-west and south-east of Ireland. It is probably more widely distributed but under-recorded and has not been reported from Northern Ireland. The species is quite widely distributed in Europe but there are no records from the Iberian Peninsula. Records from some Balkan countries suggests the species is likely to be more widespread and to occur in countries bordering the Mediterranean.

KRENOPELOPIA Fittkau, 1962

Krenopelopia binotata (Wiedemann, 1817) +

Krenopelopia nigropunctata (Staeger, 1839) +

Krenopelopia larvae are typically found in springs and occasionally in muddy seepage areas in the aquatic/terrestrial boundary zone. Two species are known from the western Palaearctic, both of which have been recorded in the Republic of Ireland only. There are few records of the two species since the larval habitat (springs) have been poorly investigated. The species are likely to be more common than the few records indicate.

***Krenopelopia binotata* (Wiedemann, 1817) +**

Known Irish and European distributions - Figures 35 and 36.

Status in Ireland: records from two locations in two HAs (9, 38) in Counties Donegal and Dublin.

Comments: *Krenopelopia binotata* is commonly recorded in northern and central Europe. However, its occurrence in Romania and the European part of Turkey suggests a broader distribution in southern Europe.

***Krenopelopia nigropunctata* (Staeger, 1839)** +

Known Irish and European distributions - Figures 37 and 38.

Status in Ireland: records from eight locations, one on Clare Island and seven in six HAs (6, 8, 31, 32, 33, 38) in Counties Donegal, Galway, Louth, Mayo and Meath.

Comments: the record for *Krenopelopia nigropunctata* in HA 38, County Donegal was inadvertently omitted in Murray *et al*. (2013). Pupal exuviae were collected by Brian Hayes (Hayes, 1991) from the River Ray at Muckish Gap (Irish Grid Reference B993268) on 12 August 1982. It is not yet known from Northern Ireland. The species is on record in northern and central Europe while its occurrence in Romania and Spain suggets it is also likely to occur in other southern European countries.

LABRUNDINIA Fittkau, 1962

Labrundinia longipalpis (Goetghebuer, 1921) +

Labrundinia larvae are known from small standing water bodies as well as rivers and streams. According to Cranston and Epler (2013), *Labrundinia longipaplis,* the only known European species, preferentially occupies bog water habitats.

***Labrundinia longipalpis* (Goetghebuer, 1921) +**

Known Irish and European distributions - Figures 39 and 40.

Status in Ireland: four records from one location in HA 31, County Galway.

Comments: in contrast to the cited preference of the species for bog waters, the records of *Labrundinia longipalpis* in Ireland (Republic of Ireland only) are from pupal exuviae collected on four separate occasions, in June and July 2006 and 2007, from Lough Anaserd. Much of the lake floor of this small shallow lake is covered by the charophyte *Chara globularis* Thuiller. The lake is surrounded by calacreous pasture lying at eight metres above sea level and aproximately 1km from the Atlantic Ocean coastline at Slyne Head. The European distribution is sporadic, with records from most of the peripheral countries but not from central and southern Europe but it is likely to be more widespread.

LARSIA Fittkau, 1962

Larsia atrocincta (Goetghebuer, 1942) +?

Larsia curticalcar (Kieffer, 1918) +

Larvae of *Larsia* occur in a variety of habitats including springs, ditches, streams and the littoral zone of lakes. Two species are known from the western Palaearctic, both of which are on record in Ireland. With the possible exception of Iceland, both species can be expected to occur in the areas of northern, central and southern Europe where records do not currently exist.

***Larsia atrocincta* (Goetghebuer, 1942) +?**

Known Irish and European distributions - Figures 41 and 42.

Status in Ireland: records from 17 locations in eight HAs (7, 22, 24, 27, 31, 35, 38, 39) in Counties Clare, Donegal, Galway, Kerry, Leitrim, Limerick, Mayo (Clare Island only), Meath and Sligo.

Comments: *Larsia atrocincta* is mostly recorded from west and south-west Ireland with just one record in the east. As noted by Murray *et al*. (2016), the record by Langton (2002) from Lough Gartan, County Donegal, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). There are no records of the species to date from Northern Ireland.

***Larsia curticalcar* (Kieffer, 1918) +**

Known Irish and European distributions - Figures 43 and 44.

Status in Ireland: records from five locations in three HAs (22, 31, 32) in Counties Galway, Kerry and Mayo.

Comments: *Larsia curticalcar* is only known from western and south-western Ireland. There are no records from Northern Ireland.

***MACROPELOPIA* Thienemann, 1916**

Macropelopia (*Macropelopia*) *adaucta* Kieffer, 1916 +*

Macropelopia (*Macropelopia*) *nebulosa* (Meigen, 1804) +*

Macropelopia (*Macropelopia*) *notata* (Meigen, 1818) +?

Macropelopia (*Macropelopia*) "Pe 1" sensu Langton, 1991 +

Macropelopia (*Macropelopia*) " spec. Norwegen" sensu Fittkau, 1962 +

[=? *rossaroi* Lencioni & Maraziali, 2005]

Macropelopia larvae are typically found in fine sediments in springs, streams, bog pools, drains and in the littoral regions of lakes. Two subgenera are now recognised in the genus, *Macropelopia* Thienemann and *Bethbilbeckia* Fittkau & Murray, since Cranston and Epler (2013) and Silva and Ekrem (2015) considered the genus *Bethbilbeckia*, that had been erected for the new species *B. floridensis* by Fittkau and Murray (1988), as a subgenus. Six species of *Macropelopia* sensu stricto are described from the western Palaearctic. One species of *Bethbilbeckia* is known in the Nearctic only.

Subgenus *MACROPELOPIA* Thienemann, 1916

There are published records from Ireland of five species-level taxa - three described species and two distinct pupal morphotypes. The three species, *Macropelopia* (*Macropelopia*) *adaucta*, *M.* (*M.*) *nebulosa* and *M.* (*M.*) *notata* are commonly found, but thus far *M. adaucta* is not recorded in the south-east and *M. notata* is unknown in the north-east. The pupal morphotypes *Macropelopia* "Pe 1" and *Macropelopia* "spec. Norwegen" are each known from separate locations. The three recognised species are likely to occur in all countries in Europe with the possible exception of Iceland for *M.*

notata. The morphotype *Macropelopia* "Pe 1" is also known from Scotland (Langton, 1991) while records of *Macropelopia* "spec. Norwegen" are known from Iceland, Norway and the alpine region of Italy (Murray, 2012c).

Macropelopia* (*Macropelopia*) *adaucta* Kieffer, 1916 +

Known Irish and European distributions - Figures 45 and 46.

Status in Ireland: records from 103 locations, seven on Clare Island and 96 in 23 HAs (1, 2, 3, 7, 9, 10, 18, 19, 20, 21, 22, 23, 26, 27, 28, 30, 31, 32, 33, 35, 36, 37, 38) in Counties Antrim, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Leitrim, Mayo, Tipperary, Tyrone and Wicklow.

Macropelopia* (*Macropelopia*) *nebulosa* (Meigen, 1804) +

Known Irish and European distributions - Figures 47 and 48.

Status in Ireland: records from 148 locations, one on Clare Island and 147 in 30 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, [$]11, 16, 17, 18, 19, 20, 21, 22, 25, 26, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Leitrim, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Waterford, [$]Wexford and Wicklow. [[$]Murray, 2017a].

***Macropelopia* (*Macropelopia*) *notata* (Meigen, 1818) +?**

Known Irish and European distributions - Figures 49 and 50.

Status in Ireland: records from 30 locations, three on Clare Island and 27 in 13 HAs (1, 7, 8, 9, 10, 22, 25, 30, 31, 32, 33, 34, 38) in Counties Donegal, Dublin, Galway, Mayo, Meath, Westmeath and Wicklow.

Comments: Murray *et al*. (2016) indicated that the record of *Macropelopia* (*Macropelopia*) *notata* from County Donegal in Langton (2002) was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Thus, while it is almost certain to occur, there are no records of the species to date from Northern Ireland.

***Macropelopia* (*Macropelopia*) "Pe 1" sensu Langton, 1991 +**

Distribution - Figures are not given for this morphotype.

Status in Ireland: record from Hydrometric Area 22 at Lough Cam, Castlegregory, County Kerry (Murray, 2010).

Comments: The morphotype is not known from Northern Ireland. It was first recognised in Great Britain from Lough Vernacher, Scotland and was included in the pupal keys of Langton (1991) and as "*Macropelopia* pe 1" in Langton and Visser (2003).

***Macropelopia* (*Macropelopia*) "spec. Norwegen" sensu Fittkau, 1962 +**

[? = *rossaroi* Lencioni & Marziali, 2005]

Distribution - Figures are not given for this morphotype.

Status in Ireland: There are two records from HA 28, County Clare.

Comments: exuviae of *Macropelopia* "spec. Norwegen" were described by Fittkau (1962) from collections in the subarctic Lake Juvvatn, Norway. The records from Ireland, in September 2009 and September 2011, were reported by Murray (2012) from Lough Keagh, Miltown Malbay. While describing the species *M. rossaroi* from high altitude Alpine glacial ponds in the Stelvio National Park, Italy, Lencioni and Marziali (2005) reported on unassociated pupal exuviae of "*M.* spec. Norwegen" also obtained in the collections that yielded adults of the new species. The authors speculated that the exuviae of "*M.* spec. Norwegen" although not directly linked with the adult, could be conspecific with *M. rossaroi*. This morphotype is also known from Iceland (Murray, 2012c).

MONOPELOPIA Fittkau, 1962

Monopelopia (Monopelopia) tenuicalcar (Kieffer, 1918) +

Two subgenera are now recognised in *Monopelopia* since Cranston and Epler (2013) treated the North American *Cantopelopia* Roback, 1971 as a subordinate group of *Monopelopia*. Species of *Monopelopia* sensu stricto are known worldwide but one species is widespread in the western Palaearctic, including Ireland, that is also known from Canada and the United States.

Subgenus *MONOPELOPIA* Fittkau, 1962

Larvae of *Monopelopia* are found in bog pools living amongst *Sphagnum* mats in acidic waters.

Monopelopia (*Monopelopia*) *tenuicalcar* (Kieffer, 1918) +

Known Irish and European distributions - Figures 51 and 52.

Status in Ireland: records from ten locations, one on Clare Island and nine in six HAs (7, 21, 32, 33, 34, 38) in Counties Cork, Donegal, Mayo and Meath.

Comments: *Monopelopia* (*Monopelopia*) *tenuicalcar* is recorded from bog and marsh pools mostly in north-western, western and south-western regions of Ireland and from two sites in the east in County Meath. It is not yet recorded in Northern Ireland. The species is widespread in western Europe but currently is not known to occur in Portugal or Iceland.

NATARSIA Fittkau, 1962

Natarsia nugax (Walker, 1856) +

Natarsia punctata (Fabricius, 1805) +

Larvae of *Natarsia* live in springs, streams, the littoral zones of lakes and occasionally in bog pools. The few Irish records are from western and south-western regions. The known distribution indicates that both species can be expected to be widespread in Europe (except possibly Iceland).

Natarsia nugax (Walker, 1856) +

Known Irish and European distributions - Figures 53 and 54.

Status in Ireland: records from three locations in two HAs (22, 30) in Counties Galway and Kerry. It is not known from Northern Ireland.

***Natarsia punctata* (Fabricius, 1805) +**

Known Irish and European distributions - Figures 55 and 56.

Status in Ireland: records from six locations, one on Clare Island and five in three HAs (22, 33, 36) in Counties Cavan, Kerry and Mayo. It is not known from Northern Ireland.

NILOTANYPUS Fittkau, 1962

Nilotanypus dubius (Meigen, 1804) +*

Larvae of *Nilotanypus* are most commonly found in shallow sandy rivers and streams. One species is known from Ireland and the western Palaearctic.

Nilotanypus dubius* (Meigen, 1804) +

Known Irish and European distributions - Figures 57 and 58.

Status in Ireland: records from 57 locations, one on Clare Island and 56 in 21 HAs (1, 4, 7, 10, 12, 16, 18, 20, 21, 22, 26, 28, 30, 31, 32, 33, 34, 35, 37, 38, 39) in Counties Antrim, Carlow, Clare, Cork, Donegal, Galway, Kerry, Kilkenny, Mayo, Meath, Roscommon, Sligo, Tipperary, Wexford and Wicklow.

Comments: *Nilotanypus dubius* is widespread in Irish rivers and streams. It is known from most of western Europe but is absent from Iceland.

PARAMERINA Fittkau, 1962 (see under *ZAVRELIMYIA* page 67)

[Figures 59 and 60 & 61 and 62]

PROCLADIUS Skuse, 1889

Procladius (*Holotanypus*) *choreus* (Meigen, 1804) +*

Procladius (*Holotanypus*) *crassinervis* (Zetterstedt, 1838) +*

[? = *culiciformis* (Linnaeus, 1767)]

Procladius (*Holotanypus*) *sagittalis* (Kieffer, 1909) +*

Procladius (*Holotanypus*) *signatus* (Zetterstedt, 1850) +*

Procladius (*Holotanypus*) *simplicistilus* Freeman, 1948 +*

Procladius (*Holotanypus*) "near *vesus* Roback" sensu Langton, 1991 +

Procladius (*Holotanypus*) "Pe 4" sensu Langton, 1991 +

Procladius (*Psilotanypus*) *flavifrons* Edwards, 1929 +

Procladius (*Psilotanypus*) *lugens* Kieffer, 1915 +

Procladius (*Psilotanypus*) *rufovittatus* (van der Wulp, 1874) +*

The genus *Procladius* has a worldwide distribution in three subgenera – *Procladius* Skuse, *Holotanypus* Roback and *Psilotanypus* Kieffer. There are no records of *Procladius* (*Procladius*) from the Holarctic Region. However, 23 species in the other subgenera are known from the western Palaearctic Region, 18 in *Procladius*

(*Holotanypus*) and five in *Procladius* (*Psilotanypus*). In providing an updated key to known pupal exuviae of West Palaearctic *Procladius*, Langton *et al*. (2015) stressed the pressing need for a revision of the genus. Eight species are known from Ireland, five in *Procladius* (*Holotanypus*) and three in *Procladius* (*Psilotanypus)*. Two additional species-level taxa are documented in Ireland as pupal morphotypes in *P.* (*Holotanypus*).

There are few or no records of *Procladius* (*Holotanypus*) species from the south-east of Ireland, however all five known species are most likely to be widespread. In the subgenus *Procladius* (*Psilotanypus*) the most common and widespread species is *P.* (*Ps*.) *rufovittatus* while *P.* (*Ps*.) *flavifrons* is only known from northern and western areas and *P.* (*Ps*.) *lugens* is represented by clusters of records in the north-east, west and south-east. *Procladius* (*Ps.*) *flavifrons* and *P.* (*Ps*.) *lugens* are likely to be widespread. All species of *Procladius* in Ireland are associated with lakes but some also occur in ponds and pools as well as slow-flowing sections of rivers and streams.

Subgenus *HOLOTANYPUS* Roback, 1982

Procladius* (*Holotanypus*) *choreus* (Meigen, 1804) +

Known Irish and European distributions - Figures 63 and 64.

Status in Ireland: records from 200 locations, eight on Clare Island, three on Rathlin Island and 189 in 33 HAs (1, 2, 3, 5, 6, 7, 10, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Leitrim, Limerick, Longford, Louth, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath and Wicklow.

Comments: *Procladius* (*Holotanypus*) *choreus* is the dominant Irish species of *Procladius* and is widespread in rivers, lakes and ponds throughout the country. It is also common in Great Britain and is widespread on continental Europe but not recorded from Latvia, Lithuania, Belarus and some Balkan countries.

Procladius* (*Holotanypus*) *crassinervis* (Zetterstedt, 1834) +

[? = *culiciformis* (Linnaeus, 1767)]

Known Irish and European distributions - Figures 65 and 66.

Status in Ireland: records from 62 locations in 21 HAs (1, 4, 7, 10, 12, 16, 18, 20, 21, 22, 26, 28, 30, 31, 32, 33, 34, 35, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Donegal, Galway, Kerry, Leitrim, Mayo, Monaghan, Roscommon, Sligo, Westmeath and Wicklow.

Comments: in the Fauna Europaea listing, Spies and Sæther (2013) present distribution data under the species name *Procladius culiciformis* (Linnaeus, 1767) and treat *P. crassinervis* (Zetterstedt, 1834) as a synonym of *P. culiciformis.* Roback (1971) had considered *P. crassinervis* "as used by British workers" to be a synonym of *P. culiciformis* and remarked that the pupae were not separable. Pupae of the majority of species within *Procladius* have a generally linear to trumpet shape

thoracic horn with a broad plastron while a minority have a globose to semi-globose horn with a reduced plastron. Roback (1980) provided a description of exuviae of *P. culiciformis* from the eastern United States of "indisputedly associated adults" (*sic.*) showing a linear pupal thoracic horn, similar to *Procladius choreus*. In keys to adult male *Procladius* in England and Ireland, Pinder (1978) and Langton and Pinder (2007) were unable to separate the species *P. choreus* (Meigen, 1804) from *P. culiciformis* that had previously been treated by Coe (1950) as a variety of *P. choreus* in England. Notwithstanding those interpretations, pupal exuviae of associated adult reared specimens of *P. crassinervis* in the senior authors collections from Ireland have globose thoracic horns with a reduced plastron and key readily to *P. crassinervis* in Langton (1991), Langton and Visser (2003) and Langton *et al*. (2015). It is evident that there is conflict in the interpretation of these taxa. While this situation remains, the Irish records are given as *P. crassinervis* based on determination of pupal exuviae from Langton (1991) and Langton and Visser (2003) and of adult males from Pinder (1978) and Langton and Pinder (2007). The only documented reports of *P. culiciformis* in Ireland are the historic records of eight male and seven female adults determined as "*Pelopia* (*Tanypus*) *culiciformis* L." from the beginning of the 20th century by Grimshaw (1912) - details of which are given in Murray *et al*. (2013).

Procladius* (*Holotanypus*) *sagittalis* (Kieffer, 1909) +

Known Irish and European distributions - Figures 67 and 68.

Status in Ireland: records from 78 locations, two on Clare Island, five on Rathlin Island and 71 in 22 HAs (1, 2, 3, 5, 6, 7, 9, 16, 17, 19, 21, 25, 26, 27, 28, 30, 33, 35, 36, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kildare, Louth, Mayo, Meath, Monaghan, Offaly, Roscommon, Waterford and Westmeath.

Comments: records of *Procladius* (*Holotanypus*) *sagittalis* in Ireland are predominantly from lakes, ponds and bog pools with a small number of records from slow-flowing rivers or outflowing rivers below lakes. It is widespread in western continental Europe but there are no records from Norway or Denmark in northern Europe or from Portugal.

Procladius* (*Holotanypus*) *signatus* (Zetterstedt, 1850) +

Known Irish and European distributions - Figures 69 and 70.

Status in Ireland: records from 45 locations in 19 HAs (3, 5, 7, 19, $21, 22, 25, 26, 27, 28, 29, 30, 32, 33, 35, 36, 37, 38, 39) in Counties Cavan, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kildare, Leitrim, Longford, Mayo, Monaghan, Sligo and Westmeath. [$Murray and Ashe, 2017].

Comments: Irish records of *Procladius* (*Holotanypus*) *signatus* are exclusively from lakes and ponds. There are few records from the central midlands and no records from the east or south east of the country. It is widely distributed in central and northern Europe but there are no records to date from Italy or the Balkan countries.

Procladius* (*Holotanypus*) *simplicistilus* Freeman, 1948 +

Known Irish and European distributions - Figures 71 and 72.

Status in Ireland: records from 73 locations in 13 HAs (3, 4, 5, 9, 6, 18, 19, 21, 22, 24, 25, 26, 27) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Mayo, Monaghan, Roscommon, Sligo, Tipperary, Waterford, Westmeath and Wicklow.

Comments: the first record in Ireland of adult males of *Procladius* (*Holotanypus*) *simplicistilus* were from collections in 1964 in south-west Ireland (Murray, 1972; Bracken and Murray, 1973). Pupal exuviae, recognised and described by Langton (1984) as "*Procladius* (*H.*) Pe 1", were known from the Republic of Ireland since 1984 and Langton (2004) published records from four locations in Northern Ireland. The morphotype, also included as "*Procladius* (*Holotanypus*) Pe 1" in the pupal keys of Langton (1991) and as "pe 1" in Langton and Visser (2003), was linked with the adult *P.* (*H.*) *simplicistilus* by Murray and Baars (2006b). The species is now known to be widespread in Ireland. It is on record from Great Britain and on continental Europe it is known from Norway, Finland, Denmark, the Netherlands, Kaliningrad, Germany and is recently recorded from the Tatra Mountains in Poland (Langton *et al*., 2015).

***Procladius* (*Holotanypus*) near *vesus* Roback sensu Langton, 1991 +**

Distribution - Figures are not given for this morphotype.

Status in Ireland: this pupal morphotype has been recorded at one location in Hydrometric Area 30 in County Galway.

Comments: the earliest Palaearctic records of this pupal morphotype were by Langton (1991) from Loch Lomond and Loch Strathbeg in Scotland. Langton and Visser (2003) designated the taxon as "*Procladius* near *vesus* Roback" based on the similarity of exuviae with the North American species *Procladius vesus* (Roback, 1971). The record from Ireland (Republic of Ireland only) was given by Murray (2010).

***Procladius* (*Holotanypus*) "Pe 4" sensu Langton, 1991 +**

Distribution - Figures are not given for this morphotype.

Status in Ireland: records from 17 locations and eight HAs (19, 25, 26, 27, 29, 30, 32, 34) in Counties Clare, Cork, Galway, Leitrim, Longford, Mayo and Sligo.

Comments: this pupal morphotype was first recognised by Langton (1984) and it remains unassociated with a known species (Langton *et al*. 2015).

Subgenus *PSILOTANYPUS* Kieffer, 1906

***Procladius* (*Psilotanypus*) *flavifrons* Edwards, 1929 +**

Known Irish and European distributions - Figures 73 and 74.

Status in Ireland: records from 23 locations in ten HAs (7, 19, 22, 26, 30, 31, 32, 34, 35, 36) in Counties Cavan, Cork, Donegal, Galway, Kerry, Leitrim, Mayo and Roscommon.

***Procladius* (*Psilotanypus*) *lugens* Kieffer, 1915 +**

Known Irish and European distributions - Figures 75 and 76.

Status in Ireland: there are sporadic records of *Procladius* (*Psilotanypus*) *lugens* from 13 locations in seven HAs (7, 16, 17, 30, 32, $33, 36) in Counties Cavan, Galway, Mayo, Monaghan and Waterford. [$Murray, 2017b].

Procladius* (*Psilotanypus*) *rufovittatus* (van der Wulp, 1874) +

Known Irish and European distributions - Figures 77 and 78.

Status in Ireland: records from 68 locations, one on Rathlin Island and 67 in 23 HAs (3, 5, 7, 10, 16, 17, 19, 20, 21, 22, 25, 26, 27, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Leitrim, Longford, Louth, Mayo, Monaghan, Roscommon, Sligo, Tipperary, Waterford, Westmeath and Wicklow.

PSECTROTANYPUS Kieffer, 1909

Psectrotanypus varius (Fabricius, 1787) +*

Two species of *Psectrotanypus* are known from the western Palaearctic, one of which occurs in Ireland and is common throughout the western Palaearctic.

Psectrotanypus varius* (Fabricius, 1787) +

Known Irish and European distributions - Figures 79 and 80.

Status in Ireland: records from 40 locations in 18 HAs (1, 2, 3, 5, 6, 7, 8, 9, 10, 12, 20, 21, 22, 25, 26, 36, 38, 39) in Counties Antrim, Cavan, Cork, Derry, Donegal, Dublin, Fermanagh, Kildare, Meath, Offaly, Westmeath and Wexford.

Comments: most existing records of *Psectrotanypus varius* are focused in north-eastern Ireland but there are a few records from the south-west and one from the south-east. It is likely to be widespread as the records show that it has been collected from pools, ponds, lakes, streams and rivers. The species is known from most of northern, western and central Europe but with some gaps particularly in southern and eastern Europe. With the possible exception of Iceland, and countries of small landmass and some islands, it can be expected to occur throughout most of Europe.

RHEOPELOPIA Fittkau, 1962

Rheopelopia eximia (Edwards, 1929) +

Rheopelopia maculipennis (Zetterstedt, 1838) +*

Rheopelopia ornata (Meigen, 1838) +*

Species within the genus *Rheopelopia* are almost exclusively Holarctic in distribution with four species known from the west Palaearctic, three of which are on record from Ireland. *Rheopelopia* larvae typically live in fast-flowing waters.

Rheopelopia maculipennis is the most common and widespread of the three Irish species while *R. eximia* and *R. ornata* have fewer scattered records, but both are likely to be widespread. All three Irish species have been collected only in rivers and

streams. *R. maculipennis* and *R. ornata*, have similar distributions and are expected to be widespread in Europe (excepting possibly Iceland, very small countries or some islands). In contrast, *R. eximia* has a much more restricted and disjunct distribution and is to date only known from Ireland, Great Britain, Sweden and Spain but it could be expected to occur at least in intervening countries such as Finland, Norway, Denmark, Germany, Austria, Italy, Switzerland, the Netherlands, Belgium and France. It may yet prove to be widespread in Europe.

***Rheopelopia eximia* (Edwards, 1929) +**

Known Irish and European distributions - Figures 81 and 82.

Status in Ireland: records from 12 locations in seven HAs (9, 10, 12, 20, 26, 32, 39) in Counties Carlow, Cork, Donegal, Kildare, Mayo, Roscommon and Wicklow. There are no records to date from Northern Ireland.

Rheopelopia maculipennis* (Zetterstedt, 1838) +

Known Irish and European distributions - Figures 83 and 84.

Status in Ireland: records from rivers at 95 locations in 24 HAs (3, 7, 9, 10, 12, 15, 16, 18, 20, 22, 25, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Waterford, Wexford and Wicklow.

Rheopelopia ornata* (Meigen, 1838) +

Known Irish and European distributions - Figures 85 and 86.

Status in Ireland: records from 17 locations in eight HAs (3, 7, 9, 10, 25, 26, 36, 38) in Counties Cavan, Derry, Donegal, Kildare, Meath, Offaly and Roscommon.

TANYPUS Meigen, 1803

Tanypus (*Tanypus*) *kraatzi* (Kieffer, 1912) +

Tanypus (*Tanypus*) *punctipennis* Meigen, 1818 +

Tanypus (*Tanypus*) *vilipennis* (Kieffer, 1918) +*

Larvae of the genus *Tanypus* live in sediments of slow-flowing waters in rivers and in silty standing waters in lakes and in organically enriched habitats (Wilson and Ruse, 2005). Two subgenera are recognised in *Tanypus*. Species in the subgenus *Apelopia* Roback, 1971 are known from Nearctic, Oriental and Neotropical regions only (Ashe and O'Connor, 2009) while species in the subgenus *Tanypus* Meigen, 1803 have a worldwide distribution. Three species are known from the west Palaearctic.

Subgenus *TANYPUS* Meigen, 1803

All three species known in the west Palaearctic are known from Ireland. There are relatively few records of the three species. *Tanypus* (*Tanypus*) *vilipennis* is the most common of the three with records clustered from lakes (likely subjected to enrichment from intensive farming) in the north midlands and in Northern Ireland. The remaining

species, *T.* (*T.*) *kraatzi* and *T.* (*T.*) *punctipennis*, are mostly associated with silty and muddy sediments of lakes, ponds and other standing water bodies but may also be encountered in slow-flowing water or, in the case of *T.* (*T.*) *punctipennis,* even in strong current.

All three species have similar widespread distributions in Europe but are thus far not recorded in parts of northern, eastern and southern Europe but may be expected to occur in these regions.

***Tanypus* (*Tanypus*) *kraatzi* (Kieffer, 1912) +**

Known Irish and European distributions - Figures 87 and 88.

Status in Ireland: records from two locations in two HAs (19, 32) in Counties Cork and Mayo. There are no records from Northern Ireland.

***Tanypus* (*Tanypus*) *punctipennis* Meigen, 1818 +**

Known Irish and European distributions - Figures 89 and 90.

Status in Ireland: records from five locations in five HAs (7, $9, 22, 25, 26) in Counties $Dublin, Kerry, Leitrim, Meath and Offaly There are no records from Northern Ireland. [$Murray and Ashe, 2017].

Tanypus* (*Tanypus*) *vilipennis* (Kieffer, 1918) +

Known Irish and European distributions - Figures 91 and 92.

Status in Ireland: records from 18 locations in seven HAs (6, 7, 17, 25, 26, 32, 36) in Counties Cavan, Fermanagh, Galway, Limerick, Louth, Monaghan, Roscommon, Waterford and Westmeath.

TELMATOPELOPIA Fittkau, 1962

Telmatopelopia nemorum (Goetghebuer, 1921) +

Larvae of this monospecific genus are generally associated with small stagnant, mostly temporary pools, peat pools and ditches but may also be found in the upper part of lowland streams.

***Telmatopelopia nemorum* (Goetghebuer, 1921) +**

Known Irish and European distributions - Figures 93 and 94.

Status in Ireland: a single record of *Telmatopelopia nemorum* in Ireland from HA 32 in the River Altahoney catchment, County Mayo (Fahy and Murray, 1972).

Comments: the River Altahoney catchment drains a mountainous bog terrain in County Mayo that provides suitable habitats for larvae of *Telmatopelopia*. There are no records from Northern Ireland. It is known from Great Britain and parts of western, central and in northern Europe (not in Norway) where larvae have also been reported from lakes (Vallenduuk and Mollet-Pillot, 2007). There are no records from France or the Iberian Peninsula but its occurrence in European Turkey indicates that it could be expected elsewhere in southern Europe. It may be a rare but potentially widespread species which should occur in most intervening countries of continental Europe.

***THIENEMANNIMYIA* Fittkau, 1957**

Thienemannimyia (*Thienemannimyia*) *carnea* (Fabricius, 1805) +*
Thienemannimyia (*Thienemannimyia*) *festiva* (Meigen, 1838) *
Thienemannimyia (*Thienemannimyia*) *fusciceps* (Edwards, 1929) *
Thienemannimyia (*Thienemannimyia*) *geijskesi* (Goetghebuer, 1934) +*
Thienemannimyia (*Thienemannimyia*) *laeta* (Meigen, 1818) +
Thienemannimyia (*Thienemannimyia*) *lentiginosa* (Fries, 1823) +
Thienemannimyia (*Thienemannimyia*) *northumbrica* (Edwards, 1929) +*
Thienemannimyia (*Thienemannimyia*) *pseudocarnea* Murray, 1976 +*
Thienemannimyia (*Hayesomyia*) *tripunctata* (Goetghebuer, 1922) +

Larvae of *Thienemannimyia* are found in lotic and lentic waters where some occur in sediments in the profundal zone of oligotrophic lakes. Eleven species are known from the Palaearctic. The genus is represented in Ireland by nine species in two subgenera, *Thienemannimyia* Fittkau and *Hayesomyia* Murray and Fittkau. Eight species of *Thienemannimyia* sensu stricto are known from Ireland. Two, *Thienemannimyia* (*Thienemannimyia*) *northumbrica* and *T.* (*T.*) *pseudocarnea* are more common and widespread in Ireland although records of the former are so far lacking from the south-east. Two species, *T.* (*T.*) *festiva* and *T.* (*T.*) *northumbrica*, appear to have restricted distributions in Europe as there are no records yet of either species from Scandinavia and few from eastern Europe. The remaining species, are quite widespread in Europe and may be expected to occur in those few countries that currently lack records.

Subgenus *THIENEMANNIMYIA* Fittkau, 1957

Thienemannimyia* (*Thienemannimyia*) *carnea* (Fabricius, 1805) +

Known Irish and European distributions - Figures 95 and 96.

Status in Ireland: records from two locations in two HAs (3, 7) in Counties Down and Meath.

***Thienemannimyia* (*Thienemannimyia*) *festiva* (Meigen, 1838) ***

Known Irish and European distributions - Figures 97 and 98.

Status in Ireland: records from one location in HA 3 in County Derry. There are no records from the Republic of Ireland.

***Thienemannimyia* (*Thienemannimyia*) *fusciceps* (Edwards, 1929) ***

Known Irish and European distributions - Figures 99 and 100.

Status in Ireland: records from one location in HA 3 on the River Bann, County Derry. There are no records from the Republic of Ireland.

Thienemannimyia* (*Thienemannimyia*) *geijskesi* (Goetghebuer, 1934) +

Known Irish and European distributions - Figures 101 and 102.

Status in Ireland: records from four locations in three HAs (3, 10, 27) in Counties Clare, Derry and Wicklow.

***Thienemannimyia* (*Thienemannimyia*) *laeta* (Meigen, 1818) +**

Known Irish and European distributions - Figures 103 and 104.

Status in Ireland: records from 12 locations in four HAs (7, 13, 30, 32) in Counties Galway, Mayo, Meath and Wexford. There are no records from Northern Ireland.

***Thienemannimyia* (*Thienemannimyia*) *lentiginosa* (Fries, 1823) +**

Known Irish and European distributions - Figures 105 and 106.

Status in Ireland: records from nine locations in seven HAs (7, 9, 22, 26, 30, 32, 38) in Counties Donegal, Dublin, Mayo, Meath, Roscommon and Kerry. There are no records from Northern Ireland.

Thienemannimyia* (*Thienemannimyia*) *northumbrica* (Edwards, 1929) +

Known Irish and European distributions - Figures 107 and 108.

Status in Ireland: records from 63 locations in 17 HAs (3, 21, 22, 25, 26, 27, 29, 30, 31, 32, 32, 33, 34, 35, 36, 37, 38) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Leitrim, Mayo, Monaghan, Roscommon, Sligo and Westmeath.

Thienemannimyia* (*Thienemannimyia*) *pseudocarnea* Murray, 1976 +

Known Irish and European distributions - Figures 109 and 110.

Status in Ireland: records from 54 locations in 16 HAs (3, 7, 9, 12, 15, 18, 20, 22, 25, 26, 27, 32, 34, 36, 38, 39) in Counties Antrim, Carlow, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Mayo, Meath, Offaly, Roscommon, Sligo, Tyrone, Waterford and Wexford.

Comments: *Thienemannimyia* (*Thienemannimyia*) *pseudocarnea*, was described from the River Flesk, Killarney, County Kerry (Murray, 1976c). The species is now known from Great Britain, Finland, Norway and several west European countries but not from Spain or Switzerland.

Subgenus *HAYESOMYIA* Murray & Fittkau, 1985

Thienemannimyia* (*Hayesomyia*) *tripunctata* (Goetghebuer, 1922) +

Known Irish and European distributions - Figures 111 and 112.

Status in Ireland: records from ten locations in four HAs (3, 7, 12, 20) in Counties Carlow, Cork, Down, Meath and Wexford.

Comments: collections in 1984 from the River Slaney, County Wexford, contained adult specimens identified as "*Tanypus*" *tripunctatus* Goetghebuer from Fittkau (1957, 1962) who had tentatively assigned the taxon to *Thienemannimyia.* Pupal exuviae and pupae identified as "*Rheopelopia* sp.?" from Langton (1984) occurred in the same collections on the River Slaney as well as pharate adults. Based on this associated material, Murray and Fittkau (1986) established the genus *Hayesomyia* for the Palaearcic species *Tanypus tripunctatus* Goetghebuer and the Nearctic species *Thienemannimyia senata* (Walley). Following studies on character variation in the immature stages, Cranston and Epler (2013) treated *Hayesomyia* as a subgenus of

Thienemannimyia, a position upheld by Silva and Ekrem (2015) from studies on phylogenetic relationships in the Tanypodinae.

In Ireland, the species is only known from the north-east (including Northern Ireland), east, south-east and south of the country. It is on record from Great Britain, Finland and several west European countries including the Iberian Peninsula and also from the island of Corsica. It is likely to occur in other Scandinavian countries and also in Italy.

TRISSOPELOPIA Kieffer, 1923

Trissopelopia longimanus (Staeger, 1839) +*

Larvae of *Trissopelopia* occur in groundwater-fed springs, streams and in the littoral zone of lakes. Six species are described, three of which have a Palaearctic distribution, two in the western Palaearctic one of which is known from Ireland.

Trissopelopia longimanus (Staeger, 1839) +*

Known Irish and European distributions - Figures 113 and 114.

Status in Ireland: records from 93 locations in 29 HAs (1, 2, 3, 4, 7, 8, 9, 10, 12, 14, 15, 18, 19, 20, 21, 22, 25, 26, 28, 30, 31, 32, 34, 35,36, 37, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kilkenny, Laois, Leitrim, Mayo, Meath, Roscommon, Sligo, Tyrone, Wexford and Wicklow.

Comments: *Trissopelopia longimanus* is common and widespread in Irish rivers and streams with some records from lakes. It has a widespread European distribution but there are no records from eastern regions of northern and southern Europe. It can be expected to occur in all major countries of Europe with the possible exception of Iceland.

XENOPELOPIA Fittkau, 1962

Xenopelopia falcigera (Kieffer, 1911) +*

Xenopelopia nigricans (Goetghebuer, 1927) +*

The genus *Xenopelopia* Fittkau includes two Irish species both of which are quite rare with mostly widely scattered locality records. Larvae occur in a variety of aquatic habitats including short-lived pools, wet ditches, pools, marshes, ponds, lakes and slow flowing lowland brooks but they are absent from fast flowing brooks and streams (Cranston and Epler, 2013; Vallenduuk and Moller-Pillot, 2007). Both species have broadly similar distributions in Europe with most records from northern, central and Western Europe. In the Mediterranean basin region, they may be restricted to habitats at higher altitudes.

Xenopelopia falcigera (Kieffer, 1911) +*

Known Irish and European distributions - Figures 115 and 116.

Status in Ireland: records from eight sites in seven HAs (3, 7, 12, 24, $25, 29, 35) in Counties Cavan, Clare, Derry, Limerick, Meath, Sligo, $Tipperary and Wexford. [$Murray and Ashe, 2017].

Xenopelopia nigricans* (Goetghebuer, 1927) +

Known Irish and European distributions - Figures 117 and 118.

Status in Ireland: records from five locations, one on Rathlin Island and four in four HAs (7, 19, 27, 38) in Counties Antrim (Rathlin Island only), Clare, Cork, Donegal and Meath.

ZAVRELIMYIA Fittkau, 1962

Zavrelimyia (*Paramerina*) *cingulata* (Walker, 1856) +*
Zavrelimyia (*Paramerina*) *divisa* (Walker, 1856) +*
Zavrelimyia (*Zavrelimyia*) *barbatipes* (Kieffer, 1911) +*
Zavrelimyia (*Zavrelimyia*) *hirtimanus* (Kieffer, 1918) +
Zavrelimyia (*Zavrelimyia*) *melanura* (Meigen, 1804) +*
Zavrelimyia (*Zavrelimyia*) *nubila* (Meigen, 1830) +

Four subgenera are now recognized in *Zavrelimyia.* Following a phylogenetic review of Tanypodinae, Silva and Ekrem (2015) amended the concept of *Zavrelimyia* to include species in the genera *Paramerina* Fittkau, *Reomyia* Roback and *Shineriella* Murray and Fittkau and conferred subgeneric status to those genera within an enlarged genus *Zavrelimyia* Fittkau. Six species in two of those subgenera are known from Ireland. Five species of *Zavrelimyia* (*Paramerina*) are known from the west Palaearctic of which two are known from Ireland while four of the eight west Palaearctic species of *Zavrelimyia* (*Zavrelimyia*) are on record in Ireland. Larvae of *Zavrelimyia* (*Paramerina*) live in a variety of standing waters but also occur in pools in small rivers and streams while those of *Zavrelimyia* (*Zavrelimyia*) are found in sandy or detritus-rich sediments of springs, streams and the littoral region of lakes.

Subgenus *PARAMERINA* Fittkau, 1962

Both *Zavrelimyia* (*Paramerina*) *cingulata* (Walker) and *Z.* (*P.*) *divisa* (Walker) are widespread in Ireland but there are more locality records for the former. Both species have been collected in flowing water (rivers and streams) and lakes while *Z.* (*P.*) *cingulata* is also encountered in ponds and pools. Records in Ireland of the pupal morphotype *Paramerina* Pe 1, that were treated as a separate taxon in Murray *et al.* (2013), belong to *Zavrelimyia* (*Paramerina*) *cingulata* following Langton & Visser (2003) [under *Paramerina pygmaea*].

The two species have broadly similar European distributions and both can be expected to occur in almost all countries (except possibly Iceland, some countries with very small land areas and some islands).

Zavrelimyia* (*Paramerina*) *cingulata* (Walker, 1856) +

Known Irish and European distributions - Figures 59 and 60.

Status in Ireland: records from 107 locations, four on Clare Island, three on Rathlin Island and 100 in 30 HAs (1, 2, 3, 4, 7, 8, 9, 10, 12, 14, 15, 18, 19, 20, 21, 22, 25, 26, 28, 30, 31, 32, 34, 35,36, 37, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Mayo, Meath, Roscommon, Tipperary, Waterford and Wicklow.

Zavrelimyia* (*Paramerina*) *divisa* (Walker, 1856) +

Known Irish and European distributions - Figures 61 and 62.

Status in Ireland: records from 51 locations in 17 HAs (3, 7, 9, 16, 18, 20, 22, 25, 26, 30, 31, 32, 33, 35, 37, 39, 40) in Counties Antrim, Armagh, Cork, Donegal, Dublin, Galway, Kerry, Leitrim, Mayo, Meath, Offaly, Roscommon, Wexford and Tipperary.

Subgenus *ZAVRELIMYIA* Fittkau, 1962

Zavrelimyia* (*Zavrelimyia*) *barbatipes* (Kieffer, 1911) +

Known Irish and European distributions - Figures 119 and 120.

Status in Ireland: records from 35 locations, one each on Clare Island and Rathlin Island and 33 in 16 HAs (1, 2, 5, 8, $12, 15, 18, 22, 30, 32, 33, 34, 36, 37, 38, 40) in Counties Antrim, Cavan, Derry, Donegal, Fermanagh, Galway, Kerry, Kilkenny, Mayo, Meath, Sligo and $Wexford. [$Murray, 2017a].

***Zavrelimyia* (*Zavrelimyia*) *hirtimanus* (Kieffer, 1918) +**

Known Irish and European distributions - Figures 121 and 122.

Status in Ireland: records from ten locations in six HAs (7, 15, 16, 20, $22, 30) in Counties $Cork, Galway, Kerry, Kilkenny, Meath and Tipperary. [$Murray, 2016b]. There are no records of the species from Northern Ireland.

Zavrelimyia* (*Zavrelimyia*) *melanura* (Meigen, 1804) +

Known Irish and European distributions - Figures 123 and 124.

Status in Ireland: records from ten locations, one on Rathlin Island and nine in seven HAs (7, 19, 32, 34, 36, 37, 38) in Counties Antrim (Rathlin Island only), Cavan, Cork, Donegal, Fermanagh, Mayo and Sligo.

***Zavrelimyia* (*Zavrelimyia*) *nubila* (Meigen, 1830) +**

Known Irish and European distributions - Figures 125 and 126.

Status in Ireland: records from cattle drinking troughs and garden barrels at three locations in two HAs (7, 8) in County Meath.

Comments: in contrast to other species of *Zavrelimyia,* larvae of *Z.* (*Z.*) *nubila* typically dwell in stagnant waters in small pools and in man-made ephemeral habitats such as garden ponds (Fittkau, 1962).

Subfamily DIAMESINAE Kieffer, 1922

***DIAMESA* Meigen, 1835**

Diamesa bohemani Goetghebuer, 1932 *

Diamesa cinerella Meigen, 1835 +

Diamesa incallida (Walker, 1856) +

Diamesa insignipes Kieffer, 1908 +*
Diamesa permacra (Walker, 1856) +
Diamesa tonsa (Haliday, 1856) +*

Larvae of *Diamesa* species are mostly associated with cool mountain streams and lakes at higher altitudes and latitudes. There are six Irish species of which four are rare and uncommon: *Diamesa bohemani* Goetghebuer, *D. cinerella* Meigen, *D. incallida* (Walker) and *D. permacra* (Walker). The remaining two species, *D. insignipes* Kieffer and *D. tonsa* (Haliday), are more widespread. Most of the Irish records are from the upper reaches of mountain streams.

All six species known in Ireland are widespread in northern and central Europe although one, *D. cinerella*, is thus far unknown in Great Britain but could be expected to occur there. Three, *D. bohemani*, *D. incallida* and *D. permacra*, are known from Iceland and discovery there of any of other three known Irish species would not be surprising. The species known in the southern European countries of Spain and Italy are mostly restricted to higher mountain habitats of the Pyrenees and Alps. Three species (*D. cinerella*, *D. insignipes* and *D. tonsa*) are reported from Corsica from altitudes of 500 metres or higher (Moubayed-Breil and Ashe, 2012) suggesting that if any of these *Diamesa* species prove to be more widespread in southern Europe, they are most likely to be found in higher altitude mountaineous areas.

***Diamesa bohemani* Goetghebuer, 1932 ***

Known Irish and European distributions Figures - 127 and 128.

Status in Ireland: records at one location in HA 3, County Down. The species is known from Northern Ireland only.

***Diamesa cinerella* Meigen, 1835 +**

Known Irish and European distributions - Figures 129 and 130.

Status in Ireland: records at one location in HA 32, County Mayo. It is not known from Northern Ireland.

Comments: records of *Diamesa cinerella* come from a study in the west of Ireland in the upper mountainous reaches of the River Altahoney catchment by Edward Fahy and cited in Fahy and Murray (1972) noting that the species was very common in the collections. Voucher specimens are no longer available.

***Diamesa incallida* (Walker, 1856) +**

Known Irish and European distributions - Figures 131 and 132.

Status in Ireland: records from three locations in three HAs (7, 9, 16) in Counties Dublin, Meath and Tipperary. It is not on record from Northern Ireland.

Diamesa insignipes* Kieffer, 1908 +

Known Irish and European distributions - Figures 133 and 134.

Status in Ireland: records from 14 locations, one on Clare Island and 13 in seven HAs (1, 3, 7, 9, 22, 32, 33) in Counties Antrim, Derry, Down, Dublin, Kerry, Mayo and Meath.

***Diamesa permacra* (Walker, 1856) +**

Known Irish and European distributions - Figures 135 and 136.

Status in Ireland: records from three locations in two HAs (9, 22) in Counties Dublin and Kerry. It is not on record from Northern Ireland.

Diamesa tonsa* (Haliday, 1856) +

Known Irish and European distributions - Figures 137 and 138.

Status in Ireland: records from 34 locations in eight HAs (1, 2, 3, 5, 9, 10, 12, 36) in Counties Antrim, Derry, Down, Dublin, Fermanagh, Longford, Tyrone and Wicklow.

Comments: *Diamesa tonsa* was described by Haliday (1856) from specimens collected in 1852 in Counties Down (Mourne Mountains) and Dublin (Fir House). It now has a widespread distribution in Western Europe, in Great Britain and from north-eastern Russia to the Iberian Peninsula (not Portugal) but is not recorded from Belgium, the Netherlands or Balkan countries although a questionable record exists from Slovakia (Ashe and O'Connor, 2009)

***POTTHASTIA* Kieffer, 1922**

Potthastia gaedii (Meigen, 1838) +*

Potthastia longimanus Kieffer, 1922 +*

Potthastia montium (Edwards, 1929) +

Potthastia larvae are generally associated with sandy substrates in both flowing and standing waters. Four species are known from the west Palaearctic, three of which are found in Ireland. Two of these, *P. gaedii* and *P. longimanus*, have many locality records and are common and widespread in standing and flowing water habitats. The third species, *P. montium*, is quite rare and is only known from three sites on rivers in the east, south-west and north-west.

Both *P. gaedii* and *P. longimanus* are also widespread in Europe and occur elsewhere in the northern hemisphere although there are no records of *Potthastia* from Iceland. *P. montium* appears to be rare in Europe and is only known from Austria, Corsica, Germany, Great Britain, France, Ireland and Spain. It is, however, likely to be found in other parts of Europe since it is known from the Near East (Asiatic Turkey), the eastern Palaearctic (Japan and the Russian Far East) and the Nearctic (U.S.A.).

Potthastia gaedii* (Meigen, 1838) +

Known Irish and European distributions - Figures 139 and 140.

Status in Ireland: records from 193 locations, one on Clare Island and 192 in 29 HAs (1, 2, 3, 4, 7, 8, 9, 10, 12, 15, 16, 18, 20, 21, 22, 25, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

Potthastia longimanus* Kieffer, 1922 +

Known Irish and European distributions - Figures 141 and 142.

Status in Ireland: records from 124 locations in 28 HAs (1, 2, 3, 4, 7, 9, 10, 12, 15, 16, 18, 19, 20, 21, 22, 25, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Longford, Mayo, Meath, Tipperary, Tyrone, Waterford, Wexford and Wicklow.

***Potthastia montium* (Edwards, 1929) +**

Known Irish and European distributions - Figures 143 and 144.

Status in Ireland: records from three locations in three HAs (10, 22, 32) in Counties Kerry, Mayo and Wicklow. It is not on record from Northern Ireland.

***PROTANYPUS* Kieffer, 1906**

Protanypus morio (Zetterstedt, 1838) +*

Protanypus larvae are typical of oligotrophic lakes where they form part of the profundal benthic community. Ten species are recorded from the Holarctic, one of which is known from Ireland.

Protanypus morio* (Zetterstedt, 1838) +

Known Irish and European distributions - Figures 145 and 146.

Status in Ireland: records from 70 locations in 21 HAs (1, 3, 4, 9, 10, 19, 21, 22, 25, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Leitrim, Mayo, Sligo, Tyrone and Wicklow.

Comments: most Irish records of *Protanypus morio* are from lakes in the south-west, west and north of the country and from a cluster of lakes in the east (mostly County Wicklow). There are no records from the midland lakes in Counties Westmeath, Cavan or Monaghan or from the larger lakes on the lower River Shannon most likely due to eutrophication. There are no records from the south-east where there are fewer lakes. In Europe, the species is also known from Great Britain, Fennoscandia, northern Russia, Estonia and Central Europe (Austria, Germany, northern Italy, the Netherlands, Poland, Switzerland). There are no records from France, Spain or eastern Europe (apart from a doubtful Romanian record). Outside of Europe, it is known in North Africa (Morocco) and the eastern Palaearctic (Mongolia, Russian Far East, Siberia). In parts of southern Europe, were it has not yet been found, it is likely to be restricted to lakes at higher altitudes and could be expected to occur in lakes in the French and Spanish Pyrenees.

***PSEUDODIAMESA* Goetghebuer, 1939**

Pseudodiamesa branickii (Nowicki, 1873) +

Pseudodiamesa larvae occupy habitats in springs, streams and lakes, including the profundal zone of oligotrophic lakes. Ten species are known, three from the western Palaearctic, one of which is on record from Ireland.

***Pseudodiamesa branickii* (Nowicki, 1873) +**

Known Irish and European distributions - Figures 147 and 148.

Status in Ireland: records from five locations in four HAs (10, 21, 22, 30) in Counties Cork, Galway, Kerry and Wicklow. It is not on record from Northern Ireland.

Comments: *Pseudodiamesa branickii* is known only from rivers and lakes in five disjunct localities in the south-west, west and east of Ireland. Further collecting will likely prove it to be a more widespread but uncommon species. It is widespread in northern and central Europe but is not recorded from some low-lying countries (e.g. Denmark, the Netherlands) and there are few records from southern Europe. It is known from Corsica at altitudes above 1,000 metres (Moubayed-Breil and Ashe, 2012) suggesting that its occurrence elsewhere in southern Europe may be restricted to higher altitudes in mountaineous regions.

Subfamily PRODIAMESINAE Sæther, 1976

MONODIAMESA Kieffer, 1922

Monodiamesa bathyphila (Kieffer, 1918) +

Monodiamesa ekmani Brundin, 1949 +*

Larvae of *Monodiamesa* live in the littoral and profundal zones of oligotrophic or mesotrophic lakes but are sporadically found in moderately eutrophic waters. Five species are known from the western Palaearctic, two of which occur in Ireland. Both *Monodiamesa bathyphila* and *M. ekmani* are quite rare in Ireland with only four and nine locality records respectively. Known records of *M. bathyphila* are from the western half of Ireland while records of *M. ekmani* are mostly confined to the northern half of the island, apart from one record in the mid west in County Clare.

M. bathyphila is more widespread in Europe, particularly in northern and middle Europe. However, records from Romania, Albania, Macedonia and Moldova indicates that it is likely to be more widespread in southern Europe. *M. ekmani*, is more restricted in its known European distributions and has only been recorded from Ireland, Great Britain, Fennoscandia, France, Germany and Austria with no records from southern Europe. Neither species is known from Iceland but the occurrence of either would not be unexpected there. Outside of Europe, both species are known from the East Palaearctic while *M. bathyphila* is also known from the Nearctic.

***Monodiamesa bathyphila* (Kieffer, 1918) +**

Known Irish and European distributions - Figures 149 and 150.

Status in Ireland: records from four sites in three HAs (18, 26, 34) in Counties Cork, Galway and Mayo. It is not on record from Northern Ireland.

Monodiamesa ekmani* Brundin, 1949 +

Known Irish and European distributions - Figures 151 and 152.

Status in Ireland: records from nine sites in five HAs (3, 5, 25, 26, 35) in Counties Antrim, Clare, Derry, Fermanagh and Leitrim.

***PRODIAMESA* Kieffer, 1906**

Prodiamesa olivacea (Meigen, 1818) +*

Larvae of *Prodiamesa olivacea* typically dwell in sandy or slightly silty sediments of slow-flowing rivers, streams, lakes and ponds and are moderately tolerant of pollution.

Prodiamesa olivacea* (Meigen, 1818) +

Known Irish and European distributions - Figures 153 and 154.

Status in Ireland: records from 176 locations, two on Clare Island and 174 in 34 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 18, 19, 20, 22, 23, 25, 26, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Longford, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

Comments: *Prodiamesa olivacea* is a very common species with numerous records throughout Ireland. It is also widespread in Europe but currently is not known from Iceland, Latvia, Belarus, some small continental countries (Liechtenstein, Monaco, San Marino and Vatican City) as well as some islands or island groups in the Arctic, the Atlantic and the Mediterranean. Outside of Europe, it is known from North Africa, the Near East, the East Palaearctic and the Nearctic.

Subfamily TELMATOGETONINAE, Wirth, 1949

***TELMATOGETON* Schiner, 1856**

Telmatogeton japonicus Tokunaga, 1933 +

Telmatogeton murrayi Sæther, 2009 *

Telmatogeton larvae live in tubes attached to natural or artificial habitats in the marine intertidal slash zone and are common on man-made coastal constructions such as breakwaters, concrete walls and offshore windmills and buoys in the north-eastern Atlantic and the Baltic Sea (Wilhelmsson and Malm, 2008). Boudewijn and Meijer (2007) have reported migrating wader birds (Charadriidae) feeding on the larvae of *T. japonicus*. Two species, *T. japonicus* and *T. murrayi*, are on record in Ireland, both of which are known from single locality records in marine habitats on the west coast (Murray, 2000b) and the north coast (Langton and Handcock, 2013) respectively. Both can be expected to occur in rocky marine shoreline habitats elsewhere around the coastline. Their apparent rarity is misleading since marine habitats have been rarely sampled for chironomids in Ireland.

***Telmatogeton japonicus* Tokunaga, 1933 +**

Known Irish and European distributions - Figures 155 and 156.

Status in Ireland: a single record from one location in HA 27 in County Clare.

Comments: in Europe, *Telmatogeton japonicus* is known from several Baltic Sea coasts (Finland, Sweden, Poland, Germany and Denmark) as well as the coast of Norway, the Netherlands, Belgium, Ireland, the Azores, Madeira, and Corsica (in the Mediterranean Sea). It can therefore be expected to occur on eastern Baltic Sea coasts, the Netherlands, Iceland, Great Britain, the Atlantic coasts of France, Spain and Portugal as well as other Mediterranean coasts. The species was originally described from Palaearctic Japan but is also known from Oriental China, Australasia, Oceania and parts of the North American coastline from Newfoundland (in Canada) to Texas (in the U.S.A.). Rainio *et al*. (2009) suggest that *T. japonicus* is an alien species that reached Europe from the Pacific Ocean attached to ships since it was first detected near large seaports in North-western Europe

***Telmatogeton murrayi* Sæther, 2009 ***

Known Irish and European distributions - Figures 157 and 158.

Status in Ireland: record from one location in HA 3 in County Antrim.

Comments: *Telmatogeton murrayi* was first reported from Iceland as *T. japonicus* by Murray (1999b) but subsequently Sæther (2009) described *T. murrayi* on the basis of his examination of one adult male and one female from the material collected by Murray (*loc. cit.*). *T. murrayi* is currently known from the coasts of Iceland (from the type material), Scotland and Northern Ireland (Langton and Handcock, 2013). It could be expected to occur at least on other Atlantic coasts of Western Europe.

***THALASSOMYA* Schiner, 1856**

Thalassomya frauenfeldi Schiner, 1856 +

Thalassomya larvae live in intertidal marine zone, particularly around harbours and river estuaries, tending to favour reduced salinity and elevated organic conditions, frequently linked with sewage discharge. One species is known from the western Palaearctic (Legakis and Murray, 2001) and Ireland.

***Thalassomya frauenfeldi* Schiner, 1856 +**

Known Irish and European distributions - Figures 159 and 160.

Status in Ireland: records from three locations, one on the Irish mainland in HA 27, County Clare and one each on the off-shore islands of Inishtearaght (County Kerry) and Clare Island (County Mayo). It is not on record from Northern Ireland.

Comments: *Thalassomya frauenfeldi* is known in Ireland from one site on a rocky shore on the south-west coast and from two offshore islands. It is likely to occur on other rocky coastal habitats around Ireland. It has also been recorded from coastal regions on Atlantic islands in the Azores, Madeira and the Canary Islands and from coastlines of Great Britain, Germany, France, Spain, Corsica, Italy, Croatia,

Montenegro, Greece and the Black Sea coasts of Bulgaria, Romania, Ukraine and southern Russia. It has not yet been reported from northern Europe but may be expected to occur on coasts of the Netherlands, Belgium, Portugal, the Mediterranean and the Black Sea.

Subfamily ORTHOCLADIINAE Kieffer, 1911

ACAMPTOCLADIUS Brundin, 1956

Acamptocladius reissi Cranston & Sæther, 1982 +

Acamptocladius submontanus (Edwards, 1932) +

Larvae of *Acamptocladius* live in bog/peat pools. Two species are known from the Palaearctic from colder or higher altitude polyhumic waters. Both species are on record in the Republic of Ireland only.

Acamptocladius reissi Cranston & Sæther, 1982 +

Known Irish and European distributions - Figures 161 and 162.

Status in Ireland: records from two locations, one on Clare Island and one in HA 10 in Counties Mayo (Clare Island only) and Wicklow. It is not on record from Northern Ireland.

Comments: *Acamptocladius reissi* is the rarer of the two Irish species with two widely separated locality records in humic bog habitats - one in the east in County Wicklow and one in the west from a bog pool on the offshore Clare Island, County Mayo. The species is sporadically distributed in western, northern and central Europe. Records from Spain and Italy are most likely from higher altitudes in the mountains of the Pyrenees and the Alps respectively.

Acamptocladius submontanus (Edwards, 1932) +

Known Irish and European distributions - Figures 163 and 164.

Status in Ireland: records from 22 locations in 11 HAs (22, 23, 27, 28, 29, 30, 31, 32, 35, 38, 39) in Counties Clare, Donegal, Galway, Kerry, Leitrim and Mayo. It is not on record from Northern Ireland.

Comments: *Acamptocladius submontanus* is more commonly encountered in Ireland with records from western parts of the island, extending from County Kerry in the south-west to County Donegal in the north-west. In Europe, it appears to have a restricted distribution with known records from north-western and northern Europe including Great Britain, the Netherlands, Denmark, Norway, Sweden, Finland, North and South European Russia.

ACRICOTOPUS Kieffer, 1921

Acricotopus lucens (Zetterstedt, 1850) +*

Acricotopus larvae occupy habitats in small streams, temporary pools and the littoral zone of lakes. While the genus is represented in Holarctic and Oriental regions, one species only occurs in the western Palaearctic region including Ireland.

Acricotopus lucens (Zetterstedt, 1850) +*

Known Irish and European distributions - Figures 165 and 166.

Status in Ireland: records from 34 locations, one on Clare Island and 33 in 20 HAs (2, 4, 7, 8, 9, 16, 19, 20, $21, 22, 23, 24, 26, 27, 30, 31, 32, 33, 34, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Kildare, Limerick, Mayo, Meath, Roscommon, Tipperary and Westmeath. [$Murray and Ashe, 2017].

Comments: larvae and pupal exuviae of *Acricotopus lucens* are found in the littoral of lakes, ponds, bog pools, rivers and streams. It is a moderately common and widely distributed species in Ireland. However, there are no records from the south-east but it is likely to occur there. It is widespread in Europe and can be expected to occur in almost all countries in which records do not currently exist.

BRILLIA Kieffer, 1913

Brillia bifida (Kieffer, 1909) +*

Brillia longifurca Kieffer, 1921 +*

Brillia larvae are commonly found in standing water in pools, ponds, the littoral zone of lakes and in flowing waters of streams, small rivers and hygropetric habitats. Eight species are known from the Palaearctic, four in the western Palaearctic of which two are common and widespread in Ireland. Both species are widespread in Europe where their distributions are broadly similar although there are no records from parts of northern Europe (including Iceland) and poorly investigated areas of eastern and southern Europe.

Brillia bifida (Kieffer, 1909) +*

Known Irish and European distributions - Figures 167 and 168.

Status in Ireland: records from 136 locations, four on Clare Island and 132 in 34 HAs (1, 2, 3, 4, 6, 7, 8, 9, 10, $11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 30, 32, 33, 34, 35, 36, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Laois, Leitrim, Limerick, Longford, Mayo, Meath, Roscommon, Sligo, Tipperary, Westmeath, Wexford and Wicklow. [$Murray, 2017a].

Comments: five distribution records of *Brillia bifida* included above are previously unpublished, details of which are: **CLARE:** HA 28 – River Inagh, Ballyvarneen, Ennistymon, (Irish Grid Reference R169149), in trout stomach contents, 22 March 1965, leg. P. Toner (DAM). **KERRY:** HA 22 – River Torc, above waterfall, Killarney (V964835), 26 August 1987 (DAM). **MEATH:** HA 7 – St Gorman's thermal pool, Ballynakill, Enfield (N740442), 6 February 2016 (DAM); HA 8 – Meadesbrook, roadside adjacent to pond (O038594), 14 November 2014 (DAM).

Brillia longifurca Kieffer, 1921 +*

Known Irish and European distributions - Figures 169 and 170.

Status in Ireland: records from 68 locations in 18 HAs (2, 3, 7, 8, 9, 10, 12, 13, 15, 18, 20, 22, 25, 26, 32, 37, 38, 39) in Counties Carlow, Cork, Derry, Donegal, Dublin, Galway, Kerry, Kildare, Mayo, Meath, Offaly, Roscommon, Tipperary, Wexford and Wicklow.

***BRYOPHAENOCLADIUS* Thienemann, 1934**

Bryophaenocladius aestivus (Brundin, 1947) +
Bryophaenocladius femineus (Edwards, 1929) +*
Bryophaenocladius furcatus (Kieffer, 1916) +
Bryophaenocladius ictericus (Meigen, 1830) +
Bryophaenocladius muscicola (Kieffer, 1906) +*
Bryophaenocladius nitidicollis (Goetghebuer, 1913) +
Bryophaenocladius simus (Edwards, 1929) +
Bryophaenocladius subvernalis (Edwards, 1929) +*
Bryophaenocladius vernalis (Goetghebuer, 1921) +
Bryophaenocladius xanthogyne (Edwards, 1929) +

Larvae of most *Bryophaenocladius* species are terrestrial or semi-terrestrial and, since such habitats have been infrequently sampled in Ireland, records are sparse. Eighty species are known in the Palaearctic (Ashe and O'Connor, 2012) Thirty five are documented from the western Palaearctic (Spies and Sæther, 2013), ten of which are known from Ireland. One of these, *B. subvernalis* is frequently is found in aquatic habitats and has records from 24 locations suggesting a widespread distribution. The remaining nine species are sporadically found with records from between one and four locations.

With the exception of *B. subvernalis,* which is widespread in Europe, the known distribution of the remaining species varies from being very restricted to widely distributed but with significant gaps. The most restricted species are *B. simus*, that is only known from Ireland and Great Britain and *B. femineus*, only known from Ireland, Great Britain and Belgium. Other species are more widespread but with significant gaps in distribution records including *B. furcatus*, thus far reported from Ireland, Great Britain, Sweden, the Netherlands, Germany, Czech Republic and European Turkey. It is likely to occur in intervening countries, particularly in eastern and southern Europe.

***Bryophaenocladius aestivus* (Brundin, 1947) +**

Known Irish and European distributions - Figures 171 and 172.

Status in Ireland: there is a single record from Hydrometric Area 32 in County Galway.

Bryophaenocladius femineus* (Edwards, 1929) +

Known Irish and European distributions - Figures 173 and 174.

Status in Ireland: records from two locations in two HAs (5, 32) in Counties Down and Mayo.

***Bryophaenocladius furcatus* (Kieffer, 1916) +**

Known Irish and European distributions - Figures 175 and 176.

Status in Ireland: records from four locations in three HAs (9, 18, 22) in Counties Dublin, Kerry and Tipperary.

***Bryophaenocladius ictericus* (Meigen, 1830) +**

Known Irish and European distributions - Figures 177 and 178.

Status in Ireland: records from three locations in three HAs (18, 21, 38) in Counties Donegal, Kerry and Tipperary.

Bryophaenocladius muscicola* (Kieffer, 1906) +

Known Irish and European distributions - Figures 179 and 180.

Status in Ireland: records from two locations in two HAs (3, 10) in Counties Derry and Wicklow. The record from HA10 in County Wicklow at Glendalough (T109964), on 25 May 2013, is previously unpublished.

***Bryophaenocladius nitidicollis* (Goetghebuer, 1913) +**

Known Irish and European distributions - Figures 181 and 182.

Status in Ireland: records from two locations in two HAs (9, 33) in Counties Dublin and Mayo.

***Bryophaenocladius simus* (Edwards, 1929) ***

Known Irish and European distributions - Figures 183 and 184.

Status in Ireland: there is one record from a pond in HA 3 in County Derry (Langton, 2006). The species is not yet recorded in the Republic of Ireland.

Bryophaenocladius subvernalis* (Edwards, 1929) +

Known Irish and European distributions - Figures 185 and 186.

Status in Ireland: records from 24 locations in 14 HAs (2, 3, $8, 9, 21, 22, 26, 29, $30, 31, 32, 34, 38, 39) in Counties Derry, Donegal, Dublin, Galway, Kerry, Mayo, $Meath, Roscommon and Sligo. [$Murray and Ashe, 2017].

***Bryophaenocladius vernalis* (Goetghebuer, 1921) +**

Known Irish and European distributions - Figures 187 and 188.

Status in Ireland: records from four locations in two HAs (32, 38) in Counties Donegal and Mayo.

***Bryophaenocladius xanthogyne* (Edwards, 1929) +**

Known Irish and European distributions - Figures 189 and 190.

Status in Ireland: there is a single record from one location in HA 12, County Wexford.

CAMPTOCLADIUS van der Wulp, 1874

Camptocladius stercorarius (De Geer, 1776) +*

This a monospecific genus whose terrestrial larvae are coprophilous, primarily associated with dung of herbivores such as cattle and horses.

Camptocladius stercorarius (De Geer, 1776) +*

Known Irish and European distributions - Figures 191 and 192.

Status in Ireland: records from ten locations, one on Clare Island and nine in eight HAs (3, 8, 9, 18, 25, 32, 35, 38) in Counties Derry, Donegal, Galway, Kildare, Leitrim, Mayo (Clare Island only), Meath, Tipperary and Westmeath.

Comments: *Camptocladius stercorarius* is known from scattered localities in Ireland but is likely to be common and widespread since it is primarily associated with animal dung in agricultural areas of the country. Moller-Pillot (2013) noted that larvae mainly live in horse and cattle manure in the Netherlands but it has also been occasionally found in rotting plant material in organic-rich soil. It is known from all of central and northern Europe (except Luxembourg, Kalingrad, Estonia and Latvia) as well as from Iceland, the Azores, Madeira and the Canary Islands. While there are gaps in the known distribution from southern Europe and the Mediterranean Basin, its potential distribution includes all agricultural regions where animal husbandry is undertaken.

CARDIOCLADIUS Kieffer, 1912

Cardiocladius capucinus (Zetterstedt, 1850) +*

Cardiocladius fuscus Kieffer, 1924 +*

Larvae of *Cardiocladius* live predominantly in fast-flowing well aerated water and are frequently associated with immature stages of Simuliidae. Four species are known from the western Palaearctic, two of which occur in Ireland, each with widely scattered locality records. Both species have broadly similar European distribution patterns with records from northern, central and southern countries but are likely to be more widespread.

Cardiocladius capucinus (Zetterstedt, 1850) +*

Known Irish and European distributions - Figures 193 and 194.

Status in Ireland: records from 16 locations in nine HAs (3, 4, 5, 10, 12, 19, 22, 32, 35) in Counties Antrim, Derry, Kerry, Leitrim, Mayo, Wexford and Wicklow.

Cardiocladius fuscus Kieffer, 1924 +*

Known Irish and European distributions - Figures 195 and 196.

Status in Ireland: records from 14 locations in six HAs (3, 7, 15, 18, 20, 22) in Counties Antrim, Cork, Derry, Kerry, Kilkenny, Meath and Waterford.

CHAETOCLADIUS Kieffer, 1911

Chaetocladius (*Chaetocladius*) *dentiforceps* (Edwards, 1929) +

Chaetocladius (*Chaetocladius*) *dissipatus* (Edwards, 1929) +

Chaetocladius (*Chaetocladius*) *insolitus* Caspers, 1987 *

Chaetocladius (*Chaetocladius*) *melaleucus* (Meigen, 1818) +*

Chaetocladius (*Chaetocladius*) *perennis* (Meigen, 1830) +*

Chaetocladius (*Chaetocladius*) *piger* (Goetghebuer, 1913) +

Chaetocladius (*Chaetocladius*) *suecicus* (Kieffer, 1916) *

The majority of *Chaetocladius* larvae are semi-aquatic and are found in wet leaves, among plants, in springs, streams, ponds and in permanent and temporary pools among decaying leaf litter. Two subgenera are recognised in *Chaetocladius*, the monospecific subgenus *Amblycladius* and the nominal subgenus *Chaetocladius* with 57 species worldwide (Ashe and O'Connor, 2012). Some 51 species are on record in the Palaearctic, 28 in the western Palaearctic, seven of which are known from Ireland. Two of these *C.* (*C.*) *melaleucus* and *C.* (*C.*) *perennis*, are more commonly found with 25 and 23 locality records respectively. The remaining five, *C.* (*C.*) *dentiforceps*, *C.* (*C.*) *dissipatus*, *C.* (*C.*) *insolitus*, *C.* (*C.*) *piger* and *C.* (*C.*) *suecicus*, have records from between one and five locations. In Europe, *C.* (*C.*) *insolitus* appears to have a restricted distribution and is only known from Ireland, Germany, Austria, Switzerland and the Ukraine. The remaining six species known from Ireland are quite widespread in Europe although there are significant gaps, particularly in eastern and southern areas.

***Chaetocladius* (*Chaetocladius*) *dentiforceps* (Edwards, 1929) +**

Known Irish and European distributions - Figures 197 and 198.

Status in Ireland: records from three locations, one on Clare Island and two in two HAs (9, 32) in Counties Dublin and Mayo. It is not known from Northern Ireland.

***Chaetocladius* (*Chaetocladius*) *dissipatus* (Edwards, 1929) +**

Known Irish and European distributions - Figures 199 and 200.

Status in Ireland: records from three locations in three HAs (9, 22, 38) in Counties Donegal, Dublin and Kerry. It is not known from Northern Ireland.

Chaetocladius* (*Chaetocladius*) *insolitus* Caspers, 1987

Known Irish and European distributions - Figures 201 and 202.

Status in Ireland: records from one location in HA 3 in County Derry. This species is thus far known from Northern Ireland only.

Chaetocladius* (*Chaetocladius*) *melaleucus* (Meigen, 1818) +

Known Irish and European distributions - Figures 203 and 204.

Status in Ireland: records from 25 locations, five on Clare Island and 20 in ten HAs (21, 28, 30, 31, 32, 33, 36, 37, 38, 40) in Counties Clare, Donegal, Fermanagh, Galway, Kerry and Mayo.

Chaetocladius* (*Chaetocladius*) *perennis* (Meigen, 1830) +

Known Irish and European distributions - Figures 205 and 206.

Status in Ireland: records from 23 locations, four on Clare Island and 19 in ten HAs (1, 3, 7, 8, 9, 22, 32, $33, 34, 38) in Counties Derry, Donegal, Down, Dublin, Galway, Kerry, Mayo, Meath and Sligo. [$Murray, 2017b].

***Chaetocladius* (*Chaetocladius*) *piger* (Goetghebuer, 1913) +**

Known Irish and European distributions - Figures 207 and 208.

Status in Ireland: records from five locations in four HAs (7, 8, 22, 33) in Counties Kerry, Kildare, Mayo and Meath. It is not known from Northern Ireland.

***Chaetocladius* (*Chaetocladius*) *suecicus* (Kieffer, 1916) ***

Known Irish and European distributions - Figures 209 and 210.

Status in Ireland: there is a single Irish record from one location in HA 3 in County Derry, Northern Ireland (Murray *et al*., 2014).

CLUNIO Haliday, 1855

Clunio marinus Haliday, 1855 +

Larvae of the genus *Clunio* occupy marine littoral coastal zone habitats feeding on algae and decaying animals. Four species are now recognised in the west Palaearctic (Legakis and Murray, 2001).

***Clunio marinus* Haliday, 1855 +**

Known Irish and European distributions - Figures 211 and 212.

Status in Ireland: records from 17 locations, one on the east coast of Clare Island and 16 in coastal regions of ten HAs (9, 10, 13, $20, 22, 27, 31, 32, $33, 38) in Counties $Cork, Clare, Donegal, Dublin, Galway, Kerry, Mayo, Wexford and Wicklow. [$Murray (2016b) for HA20 and Cork; Murray (2017b) for HA33].

Comments: *Clunio marinus* was described from Ireland by Haliday (1855) from specimens collected in the south-west of the country. It is now on record from marine coastal habitats in the east, south, west and north-west of the country. There are no records to date from Northern Ireland. In Europe, *C. marinus* is known from almost all Atlantic coastlines from northern Russia to Spain, although it is not recorded from Portugal but can be expected there. It is also known from the Atlantic islands of Iceland (Murray, 1999b), Madeira (Murray and Hughes, 2000) and Lanzarote in the Canary Islands (Murray, 2014). In addition, there are records from the Mediterranean coasts of Spain, France and Italy as well as the Black Sea coasts of Romania and Bulgaria and the Caspian Sea in southern Russia. It can be expected on other coastlines in the Mediterranean and the Black Sea. It has not been recorded from the eastern coastlines of the Baltic Sea from Finland to Kaliningrad.

CORYNONEURA Winnertz, 1846

Corynoneura arctica Kieffer, 1923 +*

Corynoneura carriana Edwards, 1924 +*

Corynoneura celeripes Winnertz, 1852 +?

Corynoneura celtica Edwards, 1924 +*

Corynoneura coronata Edwards, 1924 +

Corynoneura edwardsi Brundin, 1949 +*

Corynoneura gratias Schlee, 1968 +*

Corynoneura lacustris Edwards, 1924 +*

Corynoneura lobata Edwards, 1924 +*
Corynoneura scutellata Winnertz, 1846 +*
Corynoneura "Pe 2a" sensu Langton, 1991 +

Larvae of the genus *Corynoneura* are extremely small. They occur in a diverse range of aquatic habitats in fast-flowing rivers and mountain streams to standing waters in ditches, between fissures in submerged stones in rivers and in the littoral regions of lakes and ponds. Andersen *et al.* (2013) suggest that *Corynoneura* species have been frequently overlooked because of their small size and consequently their distribution is under-recorded. Ashe and O'Connor (2012) list 41 species from the Palaearctic Region, 20 of which are documented in Fauna Europaea (Spies and Sæther, 2013). Ten are known from Ireland.

The distribution patterns for the ten species indicate that all are likely to be widespread in Europe but none have yet been recorded from Iceland.

Corynoneura arctica Kieffer, 1923 +*

Known Irish and European distributions - Figures 213 and 214.

Status in Ireland: records from 23 locations in 11 HAs (1, 3, 4, 27, 29, 30, 32, 34, 36, 37, 38) in Counties Antrim, Clare, Derry, Donegal, Galway, Leitrim, Mayo and Westmeath.

Comments: *Corynoneura arctica* is known from parts of northern Europe and most major countries in western Europe (except Iceland, Belgium, Luxemburg and Denmark). There are no records from eastern or south-eastern Europe but it can be expected there. Its occurrence in Portugal suggests that the species may occur in elsewhere in southern Europe.

Corynoneura carriana Edwards, 1924 +*

Known Irish and European distributions - Figures 215 and 216.

Status in Ireland: records from 13 locations in 13 HAs (10, 21, 25, 26, 27, 28, 29, 30, 32, 34, 36, 37, 38) in Counties Clare, Fermanagh, Galway, Kerry, Mayo, Offaly, Westmeath and Wicklow.

Comments: *Corynoneura carriana* is widespread in Europe but it is not known from Iceland and there are significant gaps in its distribution since it is unknown from the Balkan countries and most of eastern Europe. There are no records to date from Portugal but it is likely to occur there since it is known from Spain.

Corynoneura celeripes Winnertz, 1852 +?

Known Irish and European distributions - Figures 217 and 218.

Status in Ireland: records from seven locations in seven HAs (7, 8, 19, 29, 33, 34, 35) in Counties Cavan, Cork, Galway, Leitrim, Mayo and Meath.

Comments: the record by Langton (2002) of *Corynoneura celeripes* from County Cavan, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013) according to Murray *et al*. (2016). Thus, while it is likely to occur there, there are presently no records of the species in Northern Ireland. *C. celeripes* is

widespread in Europe but unknown in Iceland, some Baltic countries, most of the Balkans, Switzerland and Italy.

Corynoneura celtica* Edwards, 1924 +

Known Irish and European distributions - Figures 219 and 220.

Status in Ireland: records from 28 locations in 16 HAs (2, 3, 9, 10, 12, 15, 18, 20, 21, 22, 26, 32, 34, 36, 37, 38) in Counties Carlow, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kilkenny, Laois, Mayo, Roscommon, Sligo and Wicklow.

Comments: *Corynoneura celtica* is commonly found in rivers in Ireland and although it appears to have a disjunct distribution in Europe and is not on record from parts of northern, eastern and south-eastern Europe. However, it is likely to be a widespread species.

***Corynoneura coronata* Edwards, 1924 +**

Known Irish and European distributions - Figures 221 and 222.

Status in Ireland: records from two locations in two HAs (8, 25) in Counties Meath and Westmeath. There are no records to date from Northern Ireland.

Comments: although there are few records of *Corynoneura coronata* in Ireland, it is likely to be a widespread species. Larvae typically are denizens of ditches and ponds. It is known from northern, central and southern Europe but there are no records to date from most of eastern Europe and the Balkans. On the Iberian Penninsula it is known from Spain but is not yet recorded from Portugal.

Corynoneura edwardsi* Brundin, 1949 +

Known Irish and European distributions - Figures 223 and 224.

Status in Ireland: records from 18 locations, three on Clare Island and 15 in ten HAs (3, 10, 16, 25, 26, 32, 34, 36, 37, 38) in Counties Cavan, Clare, Cork, Derry, Donegal, Mayo, Roscommon, Tipperary, Westmeath and Wicklow.

Comments: the Irish records of *Corynoneura edwardsi* are mostly from small lakes and ponds but there are no records from the south-west of the country. The European distribution of is broadly similar to *C. coronata.*

Corynoneura gratias* Schlee, 1968 +

Known Irish and European distributions - Figures 225 and 226.

Status in Ireland: records from ten locations in eight HAs (1, 2, 3, 4, 8, 33, 35, 39) in Counties Antrim, Derry, Donegal, Mayo and Meath.

Comments: the few records of *Corynoneura gratias* in Ireland are from rivers and streams, mostly in Northern Ireland but also from counties in the east and west. There are no records from central, south eastern or south western parts of the country. The known distribution in Europe is sporadic with gaps in eastern and southern countries. Its occurrence in Corsica suggests that it may be expected elsewhere in southern Europe, including Italy and the Balkans.

Corynoneura lacustris* Edwards, 1924 +

Known Irish and European distributions - Figures 227 and 228.

Status in Ireland: records from 30 locations in 14 HAs (4, 7, 10, 18, 21, 25, 26, 27, 31, 34, 35, 36, 37, 38) in Counties Antrim, Clare, Donegal, Fermanagh, Galway, Kerry, Leitrim, Mayo, Tipperary, Westmeath and Wicklow.

Comments: *Corynoneura lacustris* is commonly found in Irish lakes and streams but there are no records to date from the south-east of the country. It has a widespread European distribution and may be expected to occur in those eastern European and south-eastern countries in which records currently do not exist.

Corynoneura lobata* Edwards, 1924 +

Known Irish and European distributions - Figures 229 and 230.

Status in Ireland: records from 20 locations, one on Clare Island and 19 in eight HAs (1, 3, 8, 9, 21, 22, 32, 33) in Counties Clare, Derry, Donegal, Dublin, Kerry, Mayo, Meath and Tyrone.

Comments: the distribution in Ireland of *Corynoneura lobata* is broadly similar to that of *C. lacustris*. It has a widespread European distribution but there are no records to date from some Balkan countries.

Corynoneura scutellata* Winnertz, 1846 +

Known Irish and European distributions - Figures 231 and 232.

Status in Ireland: records from 19 locations in 12 HAs (6, 9, 10, 19, 21, 22, 26, 28, 33, 34, 36, 38) in Counties Clare, Cork, Donegal, Dublin, Fermanagh, Kerry, Leitrim, Louth, Mayo, Roscommon and Wicklow.

Comments: the Irish records of *Corynoneura scutellata* are from small lakes, ponds, bog pools and a recently reported record by Murray and Ashe (2017) from Briarsfield Turlough (HA 26, County Roscommon) in collections made in 1986 (Duigan, 1989, 1992). The species is widespread in Europe but with gaps in its distribution that include Iceland, Portugal and a few eastern European and Balkan countries. It is not on record from Iceland or Portugal.

***Corynoneura* "Pe 2a" sensu Langton, 1991 +**

Distribution - Figures are not given for this morphotype.

Status in Ireland: records from 12 locations in ten HAs (7, 18, 21, 22, 32, 34, 35, 37, 38, 39) in Counties Donegal, Kerry, Leitrim, Mayo, Meath and Tipperary.

Comments: the morphotype, as yet unassociated with a known species, is not known from Northern Ireland. It was first recorded in Ireland from the River Flesk, County Kerry (HA22) by Ashe (1982). However, the first published records from Ireland were from County Donegal (HAs 38 and 39) by Langton (2002). First recognised by Langton (1991) the morphotype is now reported as widespread in Europe (Langton and Visser, 2003).

CORYNONEURELLA Brundin, 1949

Corynoneurella paludosa Brundin, 1949 +?

One species of *Corynoneurella* is on record from the western Palaearctic and is also known from Ireland. Larvae are thus far unknown but pupal exuviae have been collected in flowing waters of streams.

Corynoneurella paludosa Brundin, 1949 +?

Known Irish and European distributions - Figures 233 and 234.

Status in Ireland: records from two locations, one on Clare Island and one in HA 38 in Counties Donegal and Mayo (Clare Island only).

Comments: Murray *et al*. (2016) consider the record in Fauna Europaea (Spies and Sæther, 2013) of *Corynoneurella paludosa* from Northern Ireland is a mistaken placement of the record by Langton (2002) from County Donegal, Republic of Ireland. It is known from several northern, western and southern European countries (Ireland, Great Britain, Sweden, Finland, Germany, France, Spain and Corsica) but thus far there are no records from eastern or south-eastern Europe but it can be expected to occur there.

CRICOTOPUS van der Wulp, 1874

Cricotopus (*Cricotopus*) *albiforceps* (Kieffer, 1916) +*

Cricotopus (*Cricotopus*) *algarum* (Kieffer, 1911) +

Cricotopus (*Cricotopus*) *annulator* Goetghebuer, 1927 +*

Cricotopus (*Cricotopus*) *bicinctus* (Meigen, 1818) +*

Cricotopus (*Cricotopus*) *curtus* Hirvenoja, 1973 +*

Cricotopus (*Cricotopus*) *cylindraceus* (Kieffer, 1908) +

Cricotopus (*Cricotopus*) *ephippium* (Zetterstedt, 1838) +

Cricotopus (*Cricotopus*) *festivellus* (Kieffer, 1906) +*

Cricotopus (*Cricotopus*) *flavocinctus* (Kieffer, 1924) +*

Cricotopus (*Cricotopus*) *fuscus* (Kieffer, 1909) +*

Cricotopus (*Cricotopus*) *pallidipes* Edwards, 1929 +?

Cricotopus (*Cricotopus*) *pilosellus* Brundin, 1956 +*

Cricotopus (*Cricotopus*) *polaris* Kieffer, 1926 +*

Cricotopus (*Cricotopus*) *pulchripes* Verrall, 1912 +*

Cricotopus (*Cricotopus*) *similis* Goetghebuer, 1921 +*

Cricotopus (*Cricotopus*) *tibialis* (Meigen, 1804) +

Cricotopus (*Cricotopus*) *tremulus* (Linnaeus, 1758) +*

Cricotopus (*Cricotopus*) *triannulatus* (Macquart, 1826) +*

Cricotopus (*Cricotopus*) *trifascia* Edwards, 1929 +*

Cricotopus (*Cricotopus*) *tristis* Hirvenoja, 1973 +

Cricotopus (*Cricotopus*) "pe 16" sensu Langton & Visser, 2003 +

Cricotopus (*Isocladius*) *brevipalpis* Kieffer, 1909 +

Cricotopus (*Isocladius*) *intersectus* (Staeger, 1839) +*
Cricotopus (*Isocladius*) *laricomalis* Edwards, 1932 +?
Cricotopus (*Isocladius*) *obnixus* (Walker, 1856) +?
Cricotopus (*Isocladius*) *ornatus* (Meigen, 1818) +
Cricotopus (*Isocladius*) *pilitarsis* (Zetterstedt, 1850) +
Cricotopus (*Isocladius*) *reversus* Hirvenoja, 1973 +*
Cricotopus (*Isocladius*) *speciosus* Goetghebuer, 1921 +
Cricotopus (*Isocladius*) *sylvestris* (Fabricius, 1794) +*
Cricotopus (*Isocladius*) *tricinctus* (Meigen, 1818) +*
Cricotopus (*Isocladius*) *trifasciatus* (Meigen, 1810) +*
Cricotopus (*Isocladius*) "Pe 2" sensu Langton, 1991 +
Cricotopus (*Isocladius*) "Pe 5" sensu Langton, 1991 +
Cricotopus (*Nostococladius*) *lygropis* Edwards, 1929 +
Cricotopus (*Paratrichocladius*) *rufiventris* (Meigen, 1830) +*
Cricotopus (*Paratrichocladius*) *skirwithensis* (Edwards, 1929) +*
Cricotopus (*Paratrichocladius*) *spiesi* (Ashe & O'Connor, 2012) *
Synonym *nigritus* (Goetghebuer, 1938)

Larvae of the species-rich genus *Cricotopus*, one of the largest genera in the subfamily Orthocladiinae, inhabit a diverse range of aquatic habitats. Ashe and O'Connor (2012) list 218 species worldwide with 118 in the Palaearctic of which 63 are listed in Spies and Sæther (2013) from Europe. Until recently, five subgenera were recognised in the genus: *Cricotopus* van der Wulp, *Isocladius* Kieffer, *Marius* Lehmann, *Nostococladius* Ashe & Murray and *Pseudocricotopus* Nishida. However, following DNA sequencing, Cranston and Krosch (2015) recently synonomysed *Paratrichocladius* Santos Abreu with *Cricotopus* and established a sixth subgenus, *Paratrichocladius* that has 27 species according to Ashe and O'Connor (2012). Species in four of the subgenera are known from the western Palaearctic Region and Ireland. The subgenus *Cricotopus* has 40 western Palaearctic species of which 20 are recorded from Ireland, as are 11 of the 22 western Palaearctic species in the subgenus *Isocladius*. One species of the subgenus *Nostococladius*, erected by Ashe and Murray (1980) from specimens collected from the River Flesk, Killarney, County Kerry, is also known from Europe. Eleven species in the subgenus *Paratrichocladius* are documented from the western Palaearctic, three of which are on record in Ireland.

Subgenus *CRICOTOPUS* van der Wulp, 1874

Cricotopus* (*Cricotopus*) *albiforceps* (Kieffer, 1916) +

Known Irish and European distributions Figures 235 - 236.

Status in Ireland: records from 31 locations, one on Clare Island and 30 in 17 HAs (3, 4, 7, 10, 12, 16, 18, 21, 25, 26, 28, 31, 34, 35, 37, 38, 40) in Counties Clare, Cork, Donegal, Dublin, Fermanagh, Kerry, Leitrim, Louth, Mayo (Clare Island only), Roscommon and Wicklow.

Comments: this species is known from most countries of western Europe (except Iceland, Norway and Portugal) and adjoining eastern European countries from Poland to Romania. Major gaps include most of the Balkans and most countries and regions eastwards of a line from Estonia to the Ukraine. It is doubtfully present in Latvia but likely to occur. It is likely to have a widespread distribution.

***Cricotopus* (*Cricotopus*) *algarum* (Kieffer, 1911) +**

Known Irish and European distributions - Figures 237 and 238.

Status in Ireland: record in Hydrometric Area HA 27, County Clare.

Comments: this species is recently recorded from Lough Callaun (Murray *et al*., 2014) and this record therefore post-dates Fauna Europaea distribution maps in Spies and Sæther (2013). It is known from some western and eastern continental European countries and eastern Russia. It is unknown in Great Britain, Scandinavia (except Denmark), Iberia, parts of eastern Europe, most of the Balkans and the Mediterranean Basin. However, its occurrence in some parts of the Balkans indicates that it can be expected elsewhere in southern Europe.

Cricotopus* (*Cricotopus*) *annulator* Goetghebuer, 1927 +

Known Irish and European distributions - Figures 239 and 240.

Status in Ireland: records from 136 locations, one on Clare Island and 135 in 29 HAs (1, 2, 3, 4, 7, 9, 10, 12, 13, 15, 16, 18, 20, 21, 22, 23, 25, 26, 28, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Armagh, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Longford, Louth, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

Comments: this is a widespread species in Europe but without records from some Balkan countries, parts of the Mediterranean Basin and eastern Europe. It is likely to occur in many countries and regions where records do not currently exist.

Cricotopus* (*Cricotopus*) *bicinctus* (Meigen, 1818) +

Known Irish and European distributions - Figures 241 and 242.

Status in Ireland: records from 190 locations in 33 HAs (1, 2, 3, 4, 6, 7, 9, 10, [$]11, 12, 13, 15, 16, 18, 20, 21, 22, 23, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow. [[$]Murray, 2017a].

Comments: this is the most widespread species of the subgenus *Cricotopus* in Europe that lacks records from only a few countries (Iceland and Latvia) and some Mediterranean islands and small countries with limited land area.

Cricotopus* (*Cricotopus*) *curtus* Hirvenoja, 1973 +

Known Irish and European distributions - Figures 243 and 244.

Status in Ireland: records from 56 locations in 22 HAs (1, 2, 3, 4, 7, 10, 13, 15, 16, 18, 20, 22, 25, 28, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kilkenny, Mayo, Meath, Offaly, Sligo, Tipperary, Tyrone, Wexford and Wicklow.

Comments: this species is known from most major countries of western Europe (except Iceland, Belgium, Denmark and Portugal) and eastern European countries extending from Poland to Bulgaria. Major gaps include the Balkans (it is doubtfully present in Albania), parts of the Mediterranean Basin and a broad swath of countries and regions extending from Sweden and Finland to the Ukraine and South European Russia. The species is likely to occur in most major unrecorded countries and regions.

***Cricotopus* (*Cricotopus*) *cylindraceus* (Kieffer, 1908) +**

Known Irish and European distributions - Figures 245 and 246.

Status in Ireland: records from 14 locations in eight HAs (10, 18, 20, 21, 33, 34, 37, 39) in Counties Cork, Donegal, Kerry, Mayo, Sligo and Wicklow.

Comments: this species is recorded from most countries of northern and western Europe (including Iceland) but is not on record from Denmark, Belgium, Luxembourg, Switzerland and Portugal. In eastern Europe, it is known from Hungary, Romania and European Turkey but there are no records from the Balkans, all Mediterranean islands and a large swath of countries and regions extending from Estonia and the Czech Republic eastwards to East and South European Russia. The species may be expected to occur in all major countries and regions.

***Cricotopus* (*Cricotopus*) *ephippium* (Zetterstedt, 1838) +**

Known Irish and European distributions - Figures 247 and 248.

Status in Ireland: records from eight locations, one on Clare Island and seven in six HAs (10, 15, 22, 25, 32, 34) in Counties Galway, Kerry, Kilkenny, Mayo, Offaly and Wicklow.

Comments: this species has a sporadic distribution that includes the British Isles, northern areas (Norway to North European Russia), middle Europe (Belgium, Netherlands, Germany, Poland, Slovakia and Hungary) as well as Spain and Corsica. Its occurrence in Corsica indicates that it can be expected elsewhere in southern Europe. An under-recorded species that is likely to be widespread.

Cricotopus* (*Cricotopus*) *festivellus* (Kieffer, 1906) +

Known Irish and European distributions - Figures 249 and 250.

Status in Ireland: records from 26 locations, two on Clare Island, four on Rathlin Island and 20 in 11 HAs (1, 3,18, 22, 25, 27, 29, 30, 31, 36, 38) in Counties Antrim, Clare, Derry, Donegal, Fermanagh, Galway, Kerry, Mayo (Clare Island only), Tipperary, Tyrone and Westmeath.

Comments: this species is known from most of western and northern Europe, a few eastern European countries and parts of Russia. Distribution gaps include all Mediterranean islands, all of the Balkans (except Macedonia), countries extending

from Estonia to the Ukraine as well as East and South European Russia. It is likely to occur in most major countries and regions.

Cricotopus* (*Cricotopus*) *flavocinctus* (Kieffer, 1924) +

Known Irish and European distributions - Figures 251 and 252.

Status in Ireland: records from 15 locations in seven HAs (3, 27, 29, 32, $33, 36, 38) in Counties Clare, Derry, Donegal, Galway, Mayo and Westmeath. [$Murray, 2017b].

Comments: this species is widespread in most of Europe. It is known from most northern European countries and a line of countries from the British Isles to France and Germany extending south-eastwards to Romania and to European Turkey. There are no records from the Balkan countries, Mediterranean islands, Italy and parts of eastern Europe from Poland and the Czech Republic to Central and South European Russia. It is doubtfully recorded from Spain but its occurrence in European Turkey and Romania indicates an expected occurrence elsewhere in southern Europe and it is likely to be a widespread species.

Cricotopus* (*Cricotopus*) *fuscus* (Kieffer, 1909) +

Known Irish and European distributions - Figures 253 and 254.

Status in Ireland: records from 36 locations in 18 HAs (3, 6, 7, 15, 16, 18, 21, 22, 24, 25, 26, 27, 28, 30, 32, 34, 36, 39) in Counties: Clare, Cork, Donegal, Galway, Kerry, Kildare, Kilkenny, Limerick, Mayo, Meath, Sligo, Tipperary, Waterford and Westmeath.

Comments: this species is known from most of Europe except Iceland, Norway, Sweden, all Mediterranean islands, most of the Balkans and parts of eastern Europe and Russia. It is doubtfully present in the Ukraine but may be expected in most major unrecorded countries and regions.

***Cricotopus* (*Cricotopus*) *pallidipes* Edwards, 1929 +?**

Known Irish and European distributions - Figures 255 and 256.

Status in Ireland: records from 17 locations in seven HAs (7, 18, 21, 22, 32, 33, 38) in Counties Clare, Cork, Donegal, Galway, Kerry, Kildare, Kilkenny, Limerick, Mayo, Meath, Sligo, Tipperary, Waterford and Westmeath.

Comments: Murray *et al*. (2016) indicated that the record of *Cricotopus* (*Cricotopus*) *pallidipes* from County Donegal, Republic of Ireland in Langton (2002), was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Thus, while it is likely to occur, there are no confirmed records of the species to date from Northern Ireland. The species is known from the British Isles, Spain, France, Germany, Hungary, Romania, Norway, Finland and North and east European Russia. Its occurrence in Romania as well as the Near East and North Africa indicates that it can be expected elsewhere in the Mediterranean Basin and southern Europe. It is however likely to be a widespread species occurring in most major unrecorded countries and regions.

Cricotopus* (*Cricotopus*) *pilosellus* Brundin, 1956 +

Known Irish and European distributions - Figures 257 and 258.

Status in Ireland: records from 12 locations, two each on Clare Island and Rathlin Island and eight in 5 HAs (10, 18, 34, 36, 37) in Counties Antrim (Rathlin Island only), Donegal, Fermanagh, Mayo, Tipperary and Wicklow.

Comments: known from northern Europe (including Iceland, Svalbard, Norway, Sweden, Finland and north European Russia) as well as the British Isles, and some central European countries (the Netherlands, Germany, Poland, Slovakia and Italy). It may have a restricted northern distribution and in Italy probably only occurs in the alpine region. If the species does occur in southern Europe, it may be restricted to cooler waters at higher altitudes.

Cricotopus* (*Cricotopus*) *polaris* Kieffer, 1926 +

Known Irish and European distributions - Figures 259 and 260.

Status in Ireland: records from 25 locations, one on Rathlin Island and 24 in 14 HAs (1, 4, 7, 18, 21, 22, 25, 27, 30, 32, 36, 37, 38, 39) in Counties Antrim, Clare, Derry, Donegal, Fermanagh, Galway, Kerry, Tipperary and Westmeath.

Comments: this is a species with a restricted and mostly northern distribution that includes Iceland, Norway, Sweden, Finland and north European Russia and in addition is also known from Ireland, Great Britain, Germany and Slovakia. Records may be expected from other countries in the northern half of Europe and if is a cold adapted species then any occurrences in southern Europe are likely to be restricted to cooler high mountain habitats.

Cricotopus* (*Cricotopus*) *pulchripes* Verrall, 1912 +

Known Irish and European distributions - Figures 261 and 262.

Status in Ireland: records from 24 locations, one on Clare Island and 23 in 13 HAs (1, 3, 4, 7, 9, 18, 22, 23, 32, 36, 37, 38, 40) in Counties Antrim, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Mayo, Meath, Tipperary and Tyrone.

Comments: *Cricotopus* (*C.*) *pulchripes* is known from most of western Europe and parts of northern Europe in Norway, Sweden, Finland, North and East European Russia. Apart from two regions of Russia, it is otherwise only known in eastern Europe from Poland and the Czech Republic. It appears to be absent from Mediterranean islands (except Corsica), south-eastern Europe and countries extending from the Baltic Republics to the Ukraine and South European Russia. Its occurrence in the eastern Palaearctic, the Nearctic, Corsica and the Near East is an indication that it can be expected in most major unrecorded European countries and regions.

Cricotopus* (*Cricotopus*) *similis* Goetghebuer, 1921 +

Known Irish and European distributions - Figures 263 and 264.

Status in Ireland: records from 53 locations in 18 HAs (1, 3, 4, 10, 12, 20, 21, 22, 30, 31, 32, 33, 34, 35, 37, 38, 39, 40) in Counties Antrim, Cork, Derry, Donegal, Down, Galway, Kerry, Mayo, Sligo, Tyrone and Wicklow.

Comments: *Cricotopus* (*Cricotopus*) *similis* is recorded from most western, a few eastern (Poland, Slovakia, Hungary, Romania and Bulgaria) and some northern European countries and regions (Norway, Finland, North and East European Russia). There are no records from Iceland, Sweden, Denmark, Italy, most of the Balkans and all countries extending from the Baltic Republics to the Ukraine and South European Russia. Likely to occur in almost all major unrecorded countries and regions.

***Cricotopus* (*Cricotopus*) *tibialis* (Meigen, 1804) +**

Known Irish and European distributions - Figures 265 and 266.

Status in Ireland: records from 16 locations, one on Clare island and 15 in eight HAs (7, 13, 22, 24, 25, 32, $33, 34) in Counties Cavan, Kerry, Limerick, Mayo, Meath, Westmeath and Wexford. [$Murray, 2017b].

Comments: *Cricotopus* (*Cricotopus*) *tibialis* is known from most of Europe (including Iceland and Svalbard) but is not on record in Luxembourg, Latvia, Belarus, Bulgaria, European Turkey, all of the Balkans and all Mediterranean islands. It can be expected to occur in all major unrecorded countries.

Cricotopus* (*Cricotopus*) *tremulus* (Linnaeus, 1758) +

Known Irish and European distributions - Figures 267 and 268.

Status in Ireland: Records from 87 locations in 22 HAs (1, 2, 3, 4, 7, 9, 10, 12, 15, 18, 20, 22, 25, 26, 28, 30, 32, 34, 35, 37, 38, 39) in Counties Antrim, Carlow, Clare, Cork, Derry, Donegal, Down, Galway, Kerry, Kildare, Kilkenny, Laois, Mayo, Meath, Offaly, Roscommon, Sligo, Tyrone, Waterford, Wexford and Wicklow.

Comments: this is a common species of *Cricotopus* in Ireland that is also quite widespread in Europe but with some gaps including Iceland, the Czech Republic, most of the Balkans, most Mediterranean islands and a broad swath of countries and regions extending from Kaliningrad to Northwest European Russia down to the Ukraine and South European Russia. It is likely to occur in almost all major unrecorded countries and regions.

Cricotopus* (*Cricotopus*) *triannulatus* (Macquart, 1826) +

Known Irish and European distributions - Figures 269 and 270.

Status in Ireland: records from 78 locations in 23 HAs (3, 4, 6, 7, 9, 10, 12, 15, 18, 20, 22, 25, 26, 28, 30, 31, 32, 33, 34, 36, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Kildare, Kilkenny, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Waterford and Wicklow.

Comments: a widespread species in Ireland that in the western Palaearctic is absent from relatively few countries or regions including Iceland, Luxembourg, Denmark, Kaliningrad, Lithuania, Latvia, Belarus, Northwest and South European Russia, Bosnia Herzegovina, Greece and most Mediterranean islands (except Corsica and Sicily).

Cricotopus* (*Cricotopus*) *trifascia* Edwards, 1929 +

Known Irish and European distributions - Figures 271 and 272.

Status in Ireland: records from 116 locations in 24 HAs (2, 3, 4, 6, 7, 9, 10, $11, 12, 15, 16, 18, 20, 22, 25, 26, 27, 28, 32, 33, 34, 35, 38, 39) in Counties Antrim, Carlow, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Waterford, Wexford and Wicklow. [$Murray, 2017a].

Comments: this species has quite a widespread European distribution with some gaps including Iceland, Norway, Lithuania, Kaliningrad, Belarus, Central and South European Russia, European Turkey, most of the Balkans and all Mediterranean islands except Corsica and Sicily. It may be expected to occur in almost all major unrecorded countries and regions.

Cricotopus (*Cricotopus*) *tristis* Hirvenoja, 1973 +

Known Irish and European distributions - Figures 273 and 274.

Status in Ireland: records from 17 locations in nine HAs (7, 10, 11, 20, 22, 26, 32, 34, 36) in Counties Cavan, Cork, Galway, Kerry, Mayo, Meath, Sligo, Wexford and Wicklow.

Comments: a species known from northern Europe (extending from Norway to North European Russia) but sporadic elsewhere including Ireland, Great Britain, Germany, Poland, Hungary and Italy. Likely to be widespread in the northern half of Europe but if is a cold adapted species, then any occurrences in southern Europe are likely to be restricted to cooler high mountain habitats.

Cricotopus (*Cricotopus*) "pe 16" sensu Langton & Visser, 2003 +

Distribution - Figures are not given for this taxon.

Status in Ireland: records from one location in HA 22 in County Kerry.

Comments: Langton and Visser (2003) described this pupal morphotype from southern Spain. The record from Ireland is from the south-west of the country in the River Caragh, County Kerry.

Subgenus *ISOCLADIUS* Kieffer, 1909

Cricotopus (*Isocladius*) *brevipalpis* Kieffer, 1909 +

Known Irish and European distributions - Figures 275 and 276.

Status in Ireland: records from nine locations in six HAs (18, 21, 28, 30, 32, 37) in Counties Clare, Cork, Donegal, Galway, Kerry, Mayo and Tipperary.

Comments: found in the northern half of Europe but with some gaps including Iceland, Norway and parts of eastern Europe and is doubtfully present in the Ukraine and Hungary. There are no records from southern Europe or the Mediterranean Basin but it is recorded from Moldova and North Africa (Morocco) indicating it may be expected in parts of southern Europe. Likely to be found in almost all major countries and regions of the northern half of Europe but if found in southern Europe, the species may be mostly restricted to suitable habitats at higher altitudes.

Cricotopus (*Isocladius*) *intersectus* (Staeger, 1839) +*

Known Irish and European distributions - Figures 277 and 278.

Status in Ireland: records from 45 locations, two on Rathlin Island and 43 in 21 HAs (1, 3, 5, 6, 7, $9, 22, 25, 26, 27, 28, 29, 30, 31, 32, $33, 34, 35, 36, 38, 40) in Counties Antrim, Armagh, Cavan, Clare, Down, $Dublin, Fermanagh, Galway, Kerry, Leitrim, Louth, Mayo, Monaghan, Sligo, Tyrone and Westmeath. [$HA9 and Dublin in Murray and Ashe (2017); HA33 in Murray (2017b)].
Comments: a widespread species but with some gaps including Iceland, Luxembourg, Portugal, parts of eastern Europe, most of south-eastern Europe (except Bulgaria and European Turkey) and all Mediterranean islands (except Corsica). *Cricotopus* (*Isocladius*) *intersectus* can be expected to occur in almost all major unrecorded countries and regions.

***Cricotopus* (*Isocladius*) *laricomalis* Edwards, 1932 +?**

Known Irish and European distributions - Figures 279 and 280.
Status in Ireland: records from 12 locations in eight HAs (25, 26, 27, 29, 30, 31, 32, 34) in Counties Clare, Galway, Mayo, Tipperary and Westmeath.
Comments: there are no published records of *Cricotopus* (*Isocladius*) *laricomalis* from Northern Ireland (or Ulster) and Murray *et al*. (2016) indicated that the record was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). This species is found in most western and several northern European countries but major gaps include countries extending from Northwest European Russia to Poland and southwards to Greece, East and South European Russia and all Mediterranean islands. *C.* (*I.*) *laricomalis* is likely to occur in most countries and regions currently lacking records.

***Cricotopus* (*Isocladius*) *obnixus* (Walker, 1856) +?**

Known Irish and European distributions - Figures 281 and 282.
Status in Ireland: records from seven locations in five HAs (25, 27, 30, 34, 38) in Counties Clare, Donegal, Galway and Mayo.
Comments: Murray *et al*. (2016) indicated that the record by Langton (2002) of *Cricotopus* (*Isocladius*) *obnixus* from County Donegal, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). This species is known from relatively few European countries including Ireland, Great Britain, Sweden, Finland, the Netherlands, Germany, Switzerland, Austria, Poland and the Ukraine. Since it is also known from the eastern Palaearctic (Russian Far East and East Siberia) and the Near East (Turkey), it is likely to be widespread in the northern parts of Europe and can be expected in parts of southern Europe where mostly it may be restricted to habitats at higher altitude.

***Cricotopus* (*Isocladius*) *ornatus* (Meigen, 1818) +**

Known Irish and European distributions - Figures 283 and 284.
Status in Ireland: records from three locations, one on Clare Island and two in two HAs (9, 27) in Counties Clare, Dublin and Mayo (Clare Island only). There are no records from Northern Ireland.

Comments: a widespread species in Europe with some large gaps including the smaller Baltic Republics and adjoining areas, most of the Balkans, all Mediterranean islands and doubtfully present in the Ukraine. *Cricotopus* (*Isocladius*) *ornatus* can be expected to occur in almost all major countries and regions currently lacking records.

***Cricotopus* (*Isocladius*) *pilitarsis* (Zetterstedt, 1850) +**

Known Irish and European distributions - Figures 285 and 286.

Status in Ireland: records from 12 locations in seven HAs (6, 12, 25, 26, 30, 37, 38) in Counties Donegal, Galway, Meath, Offaly and Wicklow. There are no records to date from Northern Ireland although several records from the bordering County Donegal in the Republic of Ireland suggest that the species is likely to occur there.

Comments: *Cricotopus* (*Isocladius*) *pilitarsis* is known from much of western and northern Europe but with there are major apparent distribution gaps in eastern and south-eastern Europe. It is not known from any of the Mediterranean islands. While it is likely to be widespread in the northern half of Europe, its occurrence in Romania indicates that it may be expected elsewhere in southern Europe but very likely restricted to habitats at higher altitude.

Cricotopus* (*Isocladius*) *reversus* Hirvenoja, 1973 +

Known Irish and European distributions - Figures 287 and 288.

Status in Ireland: Records from 12 locations in eight HAs (3, 5, [$]20, 21, 25, 27, 36, 38) in Counties Antrim, Clare, [$]Cork, Derry, Donegal, Fermanagh, Galway and Monaghan. [[$]Murray, 2016].

Comments: this species is also known from Great Britain, Sweden, Finland, Estonia, North and East European Russia and a series of adjoining countries extending south-eastwards from Germany and the Netherlands to Bulgaria and European Turkey. It is an under-recorded species and its occurrence in parts of both northern and southern Europe indicates that it is likely to prove to be a widespread species.

***Cricotopus* (*Isocladius*) *speciosus* Goetghebuer, 1921 +**

Known Irish and European distributions - Figures 289 and 290.

Status in Ireland: record from one location in HA 24, County Limerick.

Comments: this species has been recorded from relatively few countries in western Europe (Ireland, Great Britain, Spain, France, Belgium, the Netherlands, Germany and Austria) and two regions in the east (North and Central European Russia) but is not recorded from the Scandinavian countries or intervening areas between the Baltic and Black Seas. It is likely to be widespread in the northern half of Europe and may occur in southern Europe in habitats at higher altitude.

Cricotopus* (*Isocladius*) *sylvestris* (Fabricius, 1794) +

Known Irish and European distributions - Figures 291 and 292.

Status in Ireland: records from 95 locations, two on Clare Island, one on Rathlin Island and 92 in 28 HA's (1, 2, 3, 4, 6, 7, 9, 12, 15, 16, 18, 19, 20, 21, 22, 25, 26, 27, 29, 30, 31, 32, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare,

Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kilkenny, Laois, Limerick, Longford, Louth, Mayo, Meath, Monaghan, Offaly, Roscommon, Tipperary, Waterford, Westmeath, Wexford and Wicklow.

Comments: this species is recorded from several zoogeographical regions and has been reported from a variety of habitats including geothermal warm springs (21°C) in Iceland (Hrafnsdottir, 2005) to cooler waters in the littoral zone of ponds, lakes and lowland rivers where it is resistant to many forms of pollution (Wilson and Ruse, 2005). It is the most widespread species of the subgenus *Cricotopus* in Europe but lacking records from Svalbard, Slovenia, Greece, islands of the eastern Mediterranean Sea and some small countries and island groups of limited land area.

Cricotopus* (*Isocladius*) *tricinctus* (Meigen, 1818) +

Known Irish and European distributions - Figures 293 and 294.

Status in Ireland: records from 13 locations, one on Rathlin Island and 12 in seven HAs (7, 16, 17, 19, 21, 25, 32) in Counties Antrim (Rathlin Island only), Cork, Galway, Mayo, Meath, Tipperary, Waterford and Westmeath.

Comments: the majority of records of *Cricotopus* (*Isocladius*) *tricinctus* in Ireland are from lakes or ponds with some records from rivers. The single record from Northern Ireland is from a pond on the off-shore Rathlin Island. It is known from most of western and northern Europe and parts of eastern and southern Europe. Major gaps include most of eastern Europe, the Balkan countries and Mediterranean islands (except Corsica). The species is likely to occur in most regions currently lacking records.

Cricotopus* (*Isocladius*) *trifasciatus* (Meigen, 1810) +

Known Irish and European distributions - Figures 295 and 296.

Status in Ireland: records from 25 locations in 18 HAs (1, 3, 4, 10, 12, 19, 21, 22, 26, 27, 29, 30, 32, 33, 34, 36, 37, 38) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Mayo, Sligo, Wexford and Wicklow.

Comments: larvae of *Cricotopus* (*Isocladius*) *trifasciatus* are leaf miners in aquatic vegetation in both rivers and the littoral zone of lakes. It appears to be a widespread species in western Europe but lacking records from Iceland and Svalbard and with major gaps in occurrence in eastern Europe (extending from Lithuania to the Ukraine and South European Russia), most of the Balkans and all Mediterranean islands.

***Cricotopus* (*Isocladius*) "Pe 2" sensu Langton, 1991 +**

[? = *relucens* Hirvenoja, 1973]

Distribution - Figures are not given for this taxon.

Status in Ireland: records from one location in HA 32 in County Mayo.

Comments: Cited as "*Cricotopus iso*-pe2" in Langton and Visser (2003) who consider the possibility that this pupal morphotype may be associated with *Cricotopus* (*Isocladius*) *relucens* Hirvenoja, 1973.

***Cricotopus* (*Isocladius*) "Pe 5" sensu Langton, 1991 +**

Distribution - Figures are not given for this taxon.

Status in Ireland: records from two locations in two HAs (32, 33) in Counties Galway and Mayo.

Subgenus *NOSTOCOCLADIUS* Ashe & Murray, 1980

***Cricotopus* (*Nostococladius*) *lygropis* Edwards, 1929 +**

Known Irish and European distributions - Figures 297 and 298.

Status in Ireland: records from six locations in two HAs (20, 22) in Counties Cork and Kerry.

Comments: the subgenus *Nostococladius* was erected from specimens of *Cricotopus* (*Nostococladius*) *lygropis* that were reared from larvae living in colonies of the blue-green cyanobacterium *Nostoc parmelioides* Kützing in the River Flesk, Killarney, County Kerry (Ashe and Murray, 1980). Existing records from Ireland are confined to the south-west of the country. It is a species with a patchy but broad distribution in Europe including Great Britain, Belgium, France, Spain, Austria, Poland, Kaliningrad, Sweden, Finland and Central European Russia. The larvae are found in rivers and streams and may be expected to occur in such habitats in most European countries and regions where *N. parmeloides* occurs.

Subgenus *PARATRICHOCLADIUS* Santos Abreu, 1918

Paratrichocladius larvae occur in standing, flowing and occasionally in brackish waters.

Cricotopus* (*Paratrichocladius*) *rufiventris* (Meigen, 1830) +

Known Irish and European distributions - Figures 481 and 482.

Status in Ireland: records from 73 locations, one on Clare Island and 72 in 20 HAs (1, 2, 3, 5, 7, 9, [$]11, 12, 15, 16, 21, 22, 25, 27, 30, 31, 32, 35, 36, 38, 39) and Clare Island in Counties Antrim, Clare, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kilkenny, Limerick, Mayo, Meath, Tipperary, Tyrone, Westmeath and Wexford. [[$]Murray, 2017a].

Comments: a widespread species, not recorded from Iceland, but with some large gaps in distribution in several countries and regions stretching from Estonia and Kaliningrad and extending eastwards to South European Russia, parts of the Balkans and all islands of the eastern Mediterranean. Records may be expected from almost all countries and regions where they do not currently exist.

Cricotopus* (*Paratrichocladius*) *skirwithensis* (Edwards, 1929) +

Known Irish and European distributions - Figures 483 and 484.

Status in Ireland: records from 51 locations in 14 HAs (1, 2, 3, 4, 10, 15, 18, 19, 20, 22, 32, 33, 35, 36) in Counties Antrim, Cork, Derry, Down, Fermanagh, Kerry, Kilkenny, Laois, Mayo, Meath, Monaghan, Sligo, Tipperary, Tyrone and Wicklow.

Comments: this species is known from Great Britain and in Europe is on record from Austria, East European Russia, Finland, France, Hungary, Italy, Slovakia and the

Mediterranean islands of Corsica and Sicily. However, it is likely to occur in all major European countries and regions and is regarded by Spies and Sæther (2013) as "doubtfully present" in the majority of continental Europe apart from Portugal, Belgium, the Netherlands and the Czech Republic most of easternmost Europe (except the Ukraine and East European Russia), all of the Balkans and all Mediterranean islands (except Corsica).

***Cricotopus* (*Paratrichocladius*) *spiesi* (Ashe & O'Connor, 2012) ***

[= *nigritus* (Goetghebuer, 1938)]

Known Irish and European distributions - Figures 485 and 486.

Status in Ireland: record from one location in HA 3 in County Derry. There is no record from the Republic of Ireland to date.

Comments: the species is known from Ireland, Great Britain, France, Germany, Switzerland, Austria, Slovakia, Norway, Sweden and East European Russia. It is likely to be widespread in the northern regions and since it is commonly found in rivers and streams, *Cricotopus spiesi* may also be expected from southern Europe.

***DIPLOCLADIUS* Kieffer, 1908**

Diplocladius cultriger Kieffer, 1908 +*

Only one species of *Diplocladius* is known in the Holarctic region. Larvae occur in slow-flowing waters in springs, streams and ditches and occasionally in ponds and lakes (Moller-Pillot, 2013).

Diplocladius cultriger* Kieffer, 1908 +

Known Irish and European distributions - Figures 299 and 300.

Status in Ireland: records from four locations in four HAs (3, 8, 9, $33) in Counties Derry, Kildare, $Mayo and Meath. [$Murray and Ashe, 2017].

Comments: the few Irish records of *Diplocladius cultriger* are in the east, west and north of the country. It is widespread in northern and middle Europe but there are no records from the Iberian Peninsula. However, its occurrence in European Turkey indicates that the species can be expected elsewhere in the Mediterranean Basin and southern Europe but may be restricted there to cooler waters at higher altitudes.

***EPOICOCLADIUS* Šulc & Zavřel, 1924**

Epoicocladius ephemerae (Kieffer, 1924) +

Epoicocladius larvae and pupae are commonly found in association with ephemeropteran nymphs, with *Ephemera danica* Müller in the western Palaearctic and with *Hexagenia* spp. in the Nearctic Region. It is generally accepted that the larvae are not parasitic but the relationship with their ephemeropteran hosts has been variously noted as commensal, epizoic or phoretic. Larvae attach to the gills of the hosts and Toksheshi (1986) reported as many as eight larvae occurring on a single mayfly host.

***Epoicocladius ephemerae* (Kieffer, 1924) +**

Known Irish and European distributions - Figures 301 and 302.

Status in Ireland: records from ten locations in seven HAs (7, 15, 19, 22, 26, 34, 36) in Counties Cavan, Cork, Kerry, Laois, Leitrim, Mayo, Meath and Roscommon. There are no records from northern counties or from Northern Ireland.

Comments: *Epoicocladius ephemerae* is a widespread but uncommon species in Ireland known from ten locations but not in the north-west, north-east or south-east of the country. It is widespread in Europe but some gaps in distribution records exist. It may be expected to occur in those countries lacking records but where the host ephemeropteran species is known to occur.

***EUKIEFFERIELLA* Thienemann, 1926**

Eukiefferiella ancyla Svensson, 1986 +*
Eukiefferiella brevicalcar (Kieffer, 1911) +*
Eukiefferiella claripennis (Lundbeck, 1898) +*
Eukiefferiella clypeata (Thienemann, 1919) +*
Eukiefferiella coerulescens (Kieffer, 1926) +*
Eukiefferiella cyanea Thienemann, 1936 +
Eukiefferiella devonica (Edwards, 1929) +*
Eukiefferiella dittmari Lehmann, 1972 +*
Eukiefferiella gracei (Edwards, 1929) +
Eukiefferiella ilkleyensis (Edwards, 1929) +*
Eukiefferiella minor (Edwards, 1929) +*
Eukiefferiella tirolensis Goetghebuer, 1938 +*

Eukiefferiella larvae occur in a wide range of running water habitats. Occasional records of pupal exuviae from lakes are most likely from nearby inflowing rivers or streams. Twenty-one species are known from the western Palaearctic, 12 of which are recorded in Ireland.

Eukiefferiella ancyla* Svensson, 1986 +

Known Irish and European distributions - Figures 303 and 304.

Status in Ireland: records from ten locations in seven HAs (3, 10, 12, 22, 32, 35, 39) in Counties Carlow, Derry, Donegal, Fermanagh, Kerry, Mayo, Wexford and Wicklow.

Comments: larvae of *Eukiefferiella ancyla* are phoretic in the mantle cavity of the freshwater limpet *Ancylus fluviatilis* Müller. There are sporadic records in Ireland but none from the Irish midlands. The species is known from Great Britain but appears to have a restricted distribution in Europe where it is only known from France, Belgium, Germany, the Czech Republic, Slovakia and Sweden. Although it was described from Sweden thus far there are no records from adjoining Scandinavian countries of Norway, Finland or Denmark. There are no records from the Iberian Peninsula, Italy

or the Balkan countries. In contrast, the host species *A. fluviatilis*, is widespread in Europe (not Iceland, Russia or some eastern regions) and *E. ancyla* could potentially match the distribution of its host.

Eukiefferiella brevicalcar* (Kieffer, 1911) +

Known Irish and European distributions - Figures 305 and 306.

Status in Ireland: records from 21 locations in 13 HAs (1, 2, 3, 7, 8, 10, $11, 22, 22, 32, 26, 37, 38) in Counties Derry, Donegal, Cavan, Fermanagh, Meath, Kerry, Mayo, $Wexford and Wicklow. [$Murray, 2017a].

Comments: *Eukiefferiella brevicalcar* is a widespread species but with a few gaps in distribution. There are no records from Iceland, parts of the Balkans and eastern Europe, including some Mediterranean countries and islands.

Eukiefferiella claripennis* (Lundbeck, 1898) +

Known Irish and European distributions - Figures 307 and 308.

Status in Ireland: records from 147 locations, one on Clare Island and 146 in 27 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 18, 20, 22, 23, 25, 26, 28, 30, 32, 33, 35, 36, 38) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

Comments: larvae of *Eukiefferiella claripennis* live on mosses in fast-flowing streams and rivers. They are eurythermic and mildly tolerant of organic pollution. The species is common in Irish lotic waters. It is widespread in Europe with a distribution broadly similar to that of *E. brevicalcar*, except that it is on record in Iceland.

Eukiefferiella clypeata* (Thienemann, 1919) +

Known Irish and European distributions - Figures 309 and 310.

Status in Ireland: records from 115 locations in 25 HAs (1, 2, 3, 4, 7, 9, 10, 12, 13, 15, 18, 20, 21, 22, 25, 26, 28, 30, 31, 32, 34, 35, 36, 38, 39) in Counties Antrim, Carlow, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kilkenny, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

Comments: *Eukiefferiella clypeata* is a very common species in Irish lotic waters. There are no records from Iceland, Norway and Sweden although it is known from Finland and the bordering regions of northern Russia. Records are also lacking from several countries bordering the Baltic Sea through Belarus and the Ukraine to the Black Sea and most of the Balkans.

Eukiefferiella coerulescens* (Kieffer, 1926) +

Known Irish and European distributions - Figures 311 and 312.

Status in Ireland: Records from 85 locations, one on Clare Island and 84 in 21 HAs (1, 3, 4, 5, 7, 9, 10, 12, 21, 22, 28, 30, 31, 32, 33, 34, 35, 37, 38, 39, 40) in Counties

Antrim, Carlow, Clare, Cork, Derry, Donegal, Dublin, Galway, Kerry, Mayo, Meath, Tyrone and Wicklow.

Comments: *Eukiefferiella coerulescens* is also a common species in Irish lotic and lake littoral habitats. It is widespread in Europe but unrecorded in Iceland, Finland, Belgium and parts of the eastern and south-eastern European mainland.

***Eukiefferiella cyanea* Thienemann, 1936 +**

Known Irish and European distributions - Figures 313 and 314.

Status in Ireland: one record from Clare Island, County Mayo.

Comments: the only Irish record of *Eukiefferiella cyanea* is from a short coastal stream on Clare Island. Most European records are from western Europe and from a few countries of the east. While the species is likely to be more widely distributed, gaps exist in its known distribution in western Europe including Iceland, Great Britain, Benelux, Denmark, Finland, Ukraine, all of Russia and most of the Balkan countries.

Eukiefferiella devonica* (Edwards, 1929) +

Known Irish and European distributions - Figures 315 and 316.

Status in Ireland: records from 56 locations in 15 HAs (3, 4, 10, 12, 20, 22, 23, 25, 30, 32, 33, 34, 35, 36, 38) in Counties Antrim, Carlow, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Mayo, Sligo and Wicklow.

Comments: *Eukiefferiella devonica* is widespread in rivers in Ireland but with a noticeable absence of records from central regions where there is only a single record from a tributary of the River Shannon. The species is known from most countries in the western half of Europe but with major distribution gaps including those countries and regions north and east of the Ukraine (except Finland) and south-eastern Europe.

Eukiefferiella dittmari* Lehmann, 1972 +

Known Irish and European distributions - Figures 317 and 318.

Status in Ireland: records from 41 locations in 18 HAs (1, 2, 3, 7, 8, 9, 15, 20, 22, 25, 26, 28, 30, 32, 36, 37, 38, 39) in Counties Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Kildare, Laois, Mayo, Meath, Offaly, Roscommon and Tyrone.

Comments: the records of *Eukiefferiella dittmari* in Ireland are predominantly from the northern two-thirds of the country and while the species is known from the south and south-west of the country there are no records to date from the south-east. Almost all existing European records are from western countries apart from a record in Romania. It is thus far unrecorded from Portugal but most likely occurs there since records exist from Spain.

***Eukiefferiella gracei* (Edwards, 1929) +**

Known Irish and European distributions - Figures 319 and 320.

Status in Ireland: records from 21 locations in eight HAs (7, 8, 10, 25, 26, 28, 32, 35) in Counties Clare, Dublin, Galway, Meath, Sligo, Tipperary and Wicklow.

Comments: Irish records of *Eukiefferiella gracei* currently exist from lotic waters in central western, midland and eastern regions. There are no records from the north (including Northern Ireland) or the south of the country. The species is not known from Iceland but is widespread on continental Europe apart from Norway, Belgium and Portugal (although it is on record from Spain) as well as parts of eastern and southern Europe.

Eukiefferiella ilkleyensis* (Edwards, 1929) +

Known Irish and European distributions - Figures 321 and 322.

Status in Ireland: records from 132 locations in 26 HAs (2, 3, 4, 5, 6, 6, 8, 9, 10, 12, 15, 16, 18, 20, 22, 25, 26, 28, 30, 32, 33, 34, 35, 36, 38, 39) in Counties Antrim, Carlow, Clare, Cork, Derry, Donegal, Dublin, Galway, Kerry, Kildare, Kilkenny, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Wexford and Wicklow.

Comments: *Eukiefferiella ilkleyensis* is the most common species of *Eukiefferiella* encountered and is widely distributed in Ireland. The species is also widely distributed in western continental Europe, apart from Norway, Belgium and Denmark while there are large distribution gaps in most of eastern and southeastern Europe.

Eukiefferiella minor* (Edwards, 1929) +

Known Irish and European distributions - Figures 323 and 324.

Status in Ireland: records from 23 locations, one on Clare Island and 22 in eight HAs (3, 9, 10, 12, 21, 22, 32, 38) in Counties Derry, Donegal, Dublin, Kerry, Mayo (Clare Island only) and Wicklow.

Comments: *Eukiefferiella minor* has been recorded from diverse locations in rivers and lakes in the north, west, east and south-west of Ireland but there are no records to date from the central region in the River Shannon catchment. The species is also known from Iceland and is widespread in continental Europe but unrecorded in Belgium, the Netherlands and much of easternmost and south-eastern Europe.

Eukiefferiella tirolensis* Goetghebuer, 1938 +

Known Irish and European distributions - Figures 325 and 326.

Status in Ireland: records from eight locations in eight HAs (3, 9, 10, 12, 22, 25, 32, 38) in Counties Derry, Donegal, Galway, Kerry, Mayo and Wicklow.

Comments: there are sporadic records of *Eukiefferiella tirolensis*, predominantly from rivers, in the north, west, east and south-west of Ireland. The species is not known from Iceland, any of the Scandinavian countries, all countries and regions east of Poland and most of the Balkans.

EURYCNEMUS van der Wulp, 1874

Eurycnemus crassipes (Meigen, 1810) +

Larvae of *Eurycnemus* are found exclusively in flowing waters and are obligate ectoparasites of trichopteran larvae. Two species are known, one from Japan and the Russian Far East and one from the western Palaearctic that is also on record in Ireland.

***Eurycnemus crassipes* (Meigen, 1810) +**

Known Irish and European distributions - Figures 327 and 328.

Status in Ireland: records from 33 locations in 12 HAs (7, 10, 12, 15, 18, 20, 21, 22, 25, 26, 34, 35) in Counties Carlow, Cork, Kerry, Laois, Mayo, Meath, Offaly, Roscommon, Sligo, Waterford, Wexford and Wicklow.

Comments: Ashe *et al.* (2000a) confirmed the ectoparasitic relationship of larvae of *Eurycnemus crassipes* with pre-pupae/pupae of the trichopteran *Hydropsyche siltalai* Döhler from an in-depth study on specimens in the River Flesk, County Kerry, in south-west Ireland. The species is known from a number of rivers and locations throughout Ireland, but is yet unrecorded in the northern third of the island or in Northern Ireland. However, since *H. siltalai*, the host trichopteran species is known to occur throughout those regions (Figures 163 and 164 in O'Connor, 2015), it is quite likely that *E. crassipes* will be found there also. The species has a broad distribution in northern and western Europe but there are no records from Norway, Portugal, Italy and much of eastern, south-eastern and southern Europe. Its occurrence in East, North and Central Russia, Bosnia-Herzegovina and Cyprus indicates that additional records may be expected from eastern and southern Europe. Since its trichopteran host is widespread in Europe (O'Connor, 2015), it is similarly likely that *E. crassipes* will also be found to have a widespread European distribution with the possible exception of Iceland, the high Arctic and some smaller countries and islands with limited land area.

GEORTHOCLADIUS Strenzke, 1941

Subgenus *GEORTHOCLADIUS* Strenzke, 1941

Georthocladius (*Georthocladius*) *luteicornis* (Goetghebuer, 1941) +

Larvae of *Georthocladius* have been recorded from moist *Sphagnum* in raised bogs, in waterlogged peaty soils and in the upper reaches of small streams (Andersen *et al.*, 2013). Pupal exuviae, occasionally obtained in surface skim samples from lakes are likely to have been passively carried with stream inflow. Three species are known from the western Palaearctic, one of which is on record from Ireland.

***Georthocladius* (*Georthocladius*) *luteicornis* (Goetghebuer, 1941) +**

Known Irish and European distributions - Figures 329 and 330.

Status in Ireland: records from four locations in three HAs (22, 32, 33) in Counties Kerry and Mayo. It is not recorded in Northern Ireland.

Comments: records of *Georthocladius* (*Georthocladius*) *luteicornis* in Ireland are from lotic and lentic waters in the south and west of the country. It was first reported by Ashe (1982) from a single pupal skin collected in April 1978 in a drift sample from

the River Flesk, County Kerry, following heavy rainfall that most likely caused exuviae to be carried in to the river. The species is mostly documented in western European countries, from Scandinavia to the Iberian Peninsula, but it is likely to have a more widespread distribution which could be revealed with more intensive recording from terrestrial habitats.

***GYMNOMETRIOCNEMUS* Edwards, 1932**

Gymnometriocnemus (*Gymnometriocnemus*) *subnudus* (Edwards, 1929) +

Gymnometriocnemus (*Raphidocladius*) *brumalis* (Edwards, 1929) +*

Two subgenera are recognised in the genus, *Gymnometriocnemus* sensu stricto and *Raphidocladius*. The genus is represented by five species in the western Palaearctic and each subgenus is represented by one species in Ireland.

Subgenus *GYMNOMETRIOCNEMUS* Edwards, 1932

Gymnometriocnemus* (*Gymnometriocnemus*) *subnudus* (Edwards, 1929) +

Known Irish and European distributions - Figures 331 and 332.

Status in Ireland: records from five locations in four HAs (3, 7, 8, 38) in Counties Antrim, Donegal and Meath.

Comments: larvae of *Gymnometriocnemus* (*Gymnometriocnemus*) *subnudus* are believed to be solely terrestrial. Records from Ireland are from the north-west, north-east and eastern counties. The record by P. H. Langton in Murray *et al.* (2013) that was cited as *G.* (*Raphidocladius*) *brumalis* was incorrect since on re-examination Langton (2015b) revised that identification to *G.* (*G.*) *subnudus.* The species is known from Ireland, Great Britain, Sweden, Finland, the Netherlands, Germany, Switzerland, Italy, Austria, Slovakia, Poland, Serbia and Montenegro. It is likely to be widespread in the western Palaearctic Region.

Subgenus *RAPHIDOCLADIUS* Sæther, 1983

Gymnometriocnemus* (*Raphidocladius*) *brumalis* (Edwards, 1929) +

Known Irish and European distributions - Figures 333 and 334.

Status in Ireland: records from three locations in two HAs (3, 22) in Counties Derry and Kerry.

Comments: the record of this species by P. H. Langton from County Antrim, cited in Murray *et al*. (2013), was incorrect and based on a mistaken identification. Following examination of additional *Gymnometriocnemus,* specimens from the River Bann, Langton (2015b), revised his records of the genus in Northern Ireland (see *G.* (*G.*) s*ubnudus* above) and confirmed the presence *G.* (*Raphidocladius*) *brumalis* in the River Bann. The species is also known from Great Britain and several countries in continental western Europe, extending from Scandinavia to Spain, as well as Poland and Hungary in the east. There are no records from countries or regions east of Poland or to the south or south-east of Hungary. It is, however, likely to be widespread in Europe.

***HALOCLADIUS* Hirvenoja, 1973**

Halocladius (*Halocladius*) *fucicola* (Edwards, 1926) +
Halocladius (*Halocladius*) *variabilis* (Staeger, 1839) +*
Halocladius (*Halocladius*) *varians* (Staeger, 1839) +*
Halocladius (*Psammocladius*) *braunsi* (Goetghebuer, 1942) +*

Larvae of *Halocladius* are halobiontic, associated with macroalgae, living in the marine intertidal zone of rocky shores and in rock pools. Two subgenera are recognised *viz. Halocladius* sensu stricto, with five species in the western Palaearctic and *Psammocladius* Hirvenoja with one species. Four species are recorded from Ireland, three in the nominal subgenus and one in *Halocladius* (*Psammocladius*). Three of the four species are recorded from Northern Ireland.

Subgenus *HALOCLADIUS* Hirvenoja, 1973

***Halocladius* (*Halocladius*) *fucicola* (Edwards, 1926) +**

Known Irish and European distributions - Figures 335 and 336.

Status in Ireland: records from 11 coastal locations, two on Clare Island and nine in coastal regions of seven HAs (6, 8, 9, 10, 13, 20, $33) in Counties Louth, Cork, Dublin, $Mayo, Wexford and Wicklow. [$Murray, 2017b].

Comments: the records of *Halocladius* (*Halocladius*) *fucicola* in Ireland are from eastern, southern and western coastal locations. There are no records to date from northern coasts or from Northern Ireland. The species is known from the coasts of Europe including Norway, the Faroe Islands, Great Britain, Ireland, the Netherlands, France, Spain and the Black Sea coasts of Romania and European Turkey.

Halocladius* (*Halocladius*) *variabilis* (Staeger, 1839) +

Known Irish and European distributions - Figures 337 and 338.

Status in Ireland: records from 23 locations, two on coastal regions of Clare Island and 21 along coastal regions of ten HAs (4, 6, 8, 9, 27, 28, 29, 31, 32, 39) in Counties Antrim, Clare, Donegal, Dublin, Galway, Louth and Mayo.

Comments: records of *Halocladius* (*Halocladius*) *variabilis* in Ireland are from coastal locations in the north, east and west of the country. European records are more extensive than those of *H.* (*H.*) *fucicola.* It is also known from Great Britain, Iceland and from countries bordering Atlantic, Arctic, Baltic, Barents Sea, North Sea, Mediterranean and Adriatic Sea coastlines.

Halocladius* (*Halocladius*) *varians* (Staeger, 1839) +

Known Irish and European distributions - Figures 339 and 340.

Status in Ireland: records from nine locations in coastal regions of six HAs (3, 4, 13, 20, 31, $33) in Counties Antrim, Cork, Derry, Galway, $Mayo and Wexford. [$Murray, 2017b].

Comments: records of *Halocladius* (*Halocladius*) *varians* in Ireland are from south, west and northern coastlines. The species is widely distributed in European coastal countries including those bordering the Atlantic, the Mediterranean and the Black Sea.

Subgenus *PSAMMOCLADIUS* Hirvenoja, 1973

Halocladius (*Psammocladius*) *braunsi* (Goetghebuer, 1942) +*

Known Irish and European distributions - Figures 341 and 342.

Status in Ireland: records from two locations, one in HA3 in Northern Ireland on the coast near the mouth of the River Bann, County Derry and one from a coastal lagoon on Inishmore (Aran Islands) in Galway Bay, County Galway.

Comments: records of *Halocladius* (*Psammocladius*) *braunsi* are less frequent than those of other species in the subgenus *Halocladius*. It was first recorded in Ireland from Northern Ireland by Cranston and Hockin (1981). This species is only known from Ireland, Great Britain, Germany, the Netherlands, France and Spain but is likely to be more widespread as the paucity of records reflects the fact that sandy marine shore habitats are poorly investigated.

HELENIELLA Gowin, 1943

Heleniella ornaticollis (Edwards, 1929) +*

Larvae of *Heleniella* are characteristic of flowing waters in springs, upland streams and rivers and are considered to be cold stenothermic (Andersen *et al*., 2013). Eleven named species are known worldwide (Ashe and O'Connor, 2012) with four in the western Palaearctic of which one is known from Ireland.

Heleniella ornaticollis (Edwards, 1929) +*

Known Irish and European distributions - Figures 343 and 344.

Status in Ireland: records from 56 locations in 24 HAs (1, 2, 3, 5, 7, 11, 12, 13, 15, 18, 19, 20, 21, 22, 25, 26, 30, 32, 33, 34, 35, 37, 38, 40) in Counties Antrim, Cork, Derry, Donegal, Galway, Kerry, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo and Wexford.

Comments: existing records of *Heleniella ornaticollis* in Ireland indicate a widespread distribution. This species is also widespread in Europe, although it is not recorded from some northern regions with major gaps especially in eastern and south-eastern areas. It can be expected in most countries but is not yet recorded from Iceland and may be absent in countries with limited land area lacking suitable habitats.

HETEROTANYTARSUS Spärck, 1923

Heterotanytarsus apicalis (Kieffer, 1921) +*

Two species of *Heterotanytarsus* are on record from the western Palaearctic, one of which occurs in Ireland.

Heterotanytarsus apicalis (Kieffer, 1921) +*

Known Irish and European distributions - Figures 345 and 346.

Status in Ireland: Records from 167 locations, one on Clare Island and 166 in 26 HAs (1, 2, 3, 5, 7, 11, 12, 13, 15, 18, 19, 20, 21, 22, 25, 26, 30, 32, 33, 34, 35, 37, 38,

40) in Counties Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim, Mayo, Roscommon, Sligo, Tyrone, Westmeath and Wicklow.
Comments: larvae of *Heterotanytarsus apicalis* are commonly found in ponds, the littoral zone of mainly dystrophic lakes and in slow-flowing sections of rivers and streams. In Ireland, the majority of records are from the north-west, west and south-west of the country. The species is on record from most of northern, central and western Europe but there are significant gaps particularly in the east, the Balkans and parts of the Mediterranean Basin. It is likely to occur throughout most of Europe but in more southern areas, it may be restricted to cool water habitats at higher altitudes.

***HETEROTRISSOCLADIUS* Spärck, 1923**

Heterotrissocladius grimshawi (Edwards, 1929) +
Heterotrissocladius marcidus (Walker, 1856) +*

Heterotrissocladius larvae are found in a variety of aquatic habitats such as lakes, springs, streams, rivers and ponds. Some species are characteristic of oligotrophic and ultra-oligotrophic lakes. Eight species are known in the western Palaearctic, two of which are found in Ireland.

***Heterotrissocladius grimshawi* (Edwards, 1929) +**

Known Irish and European distributions - Figures 347 and 348.
Status in Ireland: records from 65 locations in 20 HAs (1, 9, 10, 18, 20, 21, 22, 23, 25, 26, 30, 31, 32, 33, 34, 35, 37, 38, 39, 40) in Counties Cork, Clare, Donegal, Dublin, Galway, Kerry, Leitrim, Mayo, Roscommon, Sligo, Tipperary and Wicklow.
Comments: records of *Heterotrissocladius grimshawi* in Ireland are predominantly from the north-west, west and south-west of the country with a few from the east in the Dublin and Wicklow mountains. It is not yet recorded in Northern Ireland but is known from Great Britain, the Faroe Islands, Iceland, Fennoscandia, Denmark, Germany, Belgium, France, Italy and Switzerland. The species is not known in eastern or southern Europe or the Iberian Peninsula where, if it occurs, it is likely to be confined to cooler waters at higher elevations.

Heterotrissocladius marcidus* (Walker, 1856) +

Known Irish and European distributions - Figures 349 and 350.
Status in Ireland: records from 45 locations, one on Clare Island and 44 in 18 HAs (1, 2, 3, 5, 8, 10, 19, 20, 22, 25, 30, 31, 32, 34, 36, 37, 38, 39), in Counties Antrim, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Mayo, Meath, Sligo and Wicklow.
Comments: there are fewer records of *Heterotrissocladius marcidus* in Ireland compared to *H. grimshawi* but its distribution pattern is broadly similar. It is known from Northern Ireland. The species has a widespread distribution in Europe but so far is not recorded in Iceland, parts of eastern Europe, the Balkans or Mediterranean Basin countries.

HYDROSMITTIA Ferrington & Sæther, 2011

Hydrosmittia oxoniana (Edwards, 1922) +

= *Pseudosmittia recta* (Edwards, 1929)

Larvae of *Hydrosmittia* live in submerged mosses and algae in streams, rivers, hygropetric zones in waterfalls and the littoral zone of lakes. Six species are known from the western Palaearctic, only one of which has been recorded in Ireland.

Hydrosmittia oxoniana (Edwards, 1922) +

Known Irish and European distributions - Figures 351 and 352.

Status in Ireland: records from 11 locations, one on Clare Island and ten in seven HAs (22, 28, 31, 32, 33, 35, 38) in Counties Clare, Donegal, Galway, Kerry, Leitrim and Mayo. There are no records to date from Northern Ireland.

Comments: early Irish records of *Hydrosmittia oxoniana* were documented as *Pseudosmittia recta* (Edwards 1929) in Murray (1996). It is known from sites in the north-west, west and south-west of the country. The species has a wide distribution in Europe with a noticeable absence of records from Italy, parts of the Mediterranean Basin and from territories west of Russia extending northwards from the Adriatic to the Baltic Sea. It is likely to occur throughout most of Europe.

KRENOSMITTIA Thienemann & Krüger, 1939

Krenosmittia camptophleps (Edwards, 1929) +*

Krenosmittia larvae are found in a variety of aquatic habitats including springs, streams and small rivers. Some are believed to be semi terrestrial. Five species are known from the western Palaearctic, one from Ireland.

Krenosmittia camptophleps (Edwards, 1929) +*

Known Irish and European distributions - Figures 353 and 354.

Status in Ireland: records from 23 locations in 11 HAs (3, 10, 12, 20, 21, 22, 25, 30, 32, 36, 38) in Counties Cork, Donegal, Fermanagh, Galway, Kerry, Limerick, Mayo, Tyrone and Wicklow.

Comments: Irish records of *Krenosmittia camptophleps* are from scattered locations in the east, south-west, west and north of the country including Northern Ireland. It is widely distributed in Europe but there are some gaps including Iceland, Belgium, the Czech Republic, most of eastern and parts of southern Europe. However, it is likely to occur in almost all major European countries.

LIMNOPHYES Eaton, 1875

Limnophyes angelicae Sæther, 1990 +*

Limnophyes asquamatus Andersen, 1937 +*

= *smolandicus* Brundin, 1947

Limnophyes difficilis Brundin, 1947 *

Limnophyes edwardsi Sæther, 1990 +*

Limnophyes gurgicola (Edwards, 1929) +*
Limnophyes habilis (Walker, 1856) +*
= *truncorum* (Goetghebuer, 1921)
Limnophyes minimus (Meigen, 1818) +*
Limnophyes natalensis (Kieffer, 1914) +*
Limnophyes ninae Sæther, 1975 *
Limnophyes pentaplastus (Kieffer, 1921) +*
Limnophyes platystylus Murray, 2007 +
Limnophyes pumilio (Holmgren, 1869) +*
= *globifer* (Lundström, 1915)
Limnophyes spinigus Sæther, 1990 +*

Larvae of the genus *Limnophyes* are found in most types of aquatic, semiaquatic and in some moist terrestrial habitats. The majority of species, however, are believed to be semiaquatic. Thirty species are known from the western Palaearctic, 13 of which are on record from Ireland. There are few records for the majority of Irish species. Three species, *L. difficilis*, *L. ninae* and *L. platystylus*, are each known just from single locations in Ireland, the former two from Northern Ireland and the latter one from the Republic of Ireland. There are two records of *L. angelicae*, one each in Northern Ireland and the Republic of Ireland. The greatest number of records, 28, are for *L. minimus*, followed by 18 for *L. pentaplastus*, 15 for *L. natalensis*, 14 for *L. pumilo* and 13 for *L. gurgicola*. The remaining species have been recorded at 4 or 5 locations only.

Of those species known from Ireland, the nine most widely distributed in Europe are *L. asquamatus*, *L. difficilis*, *L. edwardsi*, *L. habilis*, *L. minimus*, *L. natalensis, L. ninae*, *L. pentaplastus* and *L. pumilo* but there are gaps in their known distributions particularly in eastern and southern areas. The four remaining species known from Ireland have more restricted European distributions: *L. platystylus* is currently endemic to Ireland; *L. angelicae* is only known from Great Britain, Germany, Finland and North and East European Russia; *L. gurgicola* occurs in western, middle and southern Europe but there are no records from northern areas; *L. spinigus* is only known from the British Isles, Fennoscandia, Germany, France and Italy. With more collection effort, most species are likely to prove to be widely distributed.

Limnophyes angelicae* Sæther, 1990 +

Known Irish and European distributions - Figures 355 and 356.

Status in Ireland: records from two locations, one in HA 3, County Derry and one on Clare Island, County Mayo.

Limnophyes asquamatus* Andersen, 1937 +

[= *smolandicus* Brundin, 1947]

Known Irish and European distributions - Figures 357 and 358.

Status in Ireland: records from five - locations in four HAs (3, 18, 32, 37) in Counties Derry, Donegal, Mayo and Tipperary.

***Limnophyes difficilis* Brundin, 1947 ***

Known Irish and European distributions - Figures 359 and 360.

Status in Ireland: one record from a single location in HA 3, County Derry.

Limnophyes edwardsi* Sæther, 1990 +

Known Irish and European distributions - Figures 361 and 362.

Status in Ireland: records from five locations in four HAs (3, 10, 26, 38) in Counties Derry, Donegal, Leitrim and Wicklow.

Limnophyes gurgicola* (Edwards, 1929) +

Known Irish and European distributions - Figures 363 and 364.

Status in Ireland: records from 14 locations, two on Clare Island and 12 in eight HAs (3, 7, 9, 10, 13, 22, 33, 38) in Counties Derry, Donegal, Dublin, Kerry, Mayo (Clare Island only), Meath, Wexford and Wicklow.

Limnophyes habilis* (Walker, 1856) +

[= *truncorum* (Goetghebuer, 1921)]

Known Irish and European distributions - Figures 365 and 366.

Status in Ireland: records from six locations, one on Clare Island and five in four HAs (3, 8, 9, 38) in Counties Derry, Donegal, Dublin, Mayo (Clare Island only) and Meath.

Limnophyes minimus* (Meigen, 1818) +

Known Irish and European distributions - Figures 367 and 368.

Status in Ireland: records from 29 locations, two on Clare Island and ten in 12 HAs (3, 6, 7, 8, 9, 22, 29, 32, 33, 35, 38, 39) in Counties Antrim, Cavan, Derry, Donegal, Dublin, Galway, Kerry, Leitrim, Louth, Mayo and Meath.

Limnophyes natalensis* (Kieffer, 1914) +

Known Irish and European distributions - Figures 369 and 370.

Status in Ireland: records from 15 locations, four on Clare Island, one on Inistearaght Island and ten in 12 HAs (3, 22, 26, 37, 38) in Counties Derry, Donegal, Kerry, Leitrim and Mayo.

Comments: The record of *Limnophyes natalensis* from Inistearaght Island reported in Murray *et al*. (2014) from Sæther (1990) was incorrectly assigned to County Cork rather than County Kerry.

***Limnophyes ninae* Sæther, 1975 ***

Known Irish and European distributions - Figures 371 and 372.

Status in Ireland: records on two occasions from a single location in HA 3, County Derry, Northern Ireland.

Comments: the Irish records of *Limnophyes ninae* are exclusively from Northern Ireland and there are no records from the Republic of Ireland.

Limnophyes pentaplastus* (Kieffer, 1921) +

Known Irish and European distributions - Figures 373 and 374.

Status in Ireland: records from 18 locations, two on Clare Island and 16 in 10 HAs (1, 3, 7, 8, 9, 10, 32, 35, 36, 39) in Counties Cavan, Derry, Donegal, Dublin, Leitrim, Mayo , Meath, Monaghan and Wicklow.

***Limnophyes platystylus* Murray, 2007 +**

Known Irish and European distributions - Figures 375 and 376.

Status in Ireland: records on three separate occasions from the type locality in HA 8, County Meath.

Comments: *Limnophyes platystylus* was described from specimens collected in a seasonal pond at the type locality in County Meath (Murray, 2007). Thus far there are no records of the species from other European countries.

Limnophyes pumilio* (Holmgren, 1869) +

[= *globifer* (Lundstrom, 1915)]

Known Irish and European distributions - Figures 377 and 378.

Status in Ireland: records from 14 locations in nine HAs (3, $9, 22, 23, 27, 33, 35, 38, 39) in Counties Clare, Derry, Donegal, $Dublin, Kerry, Leitrim and Mayo. [$Murray and Ashe, 2017].

Limnophyes spinigus* Sæther, 1990 +

Known Irish and European distributions - Figures 379 and 380.

Status in Ireland: records from four locations in two HAs (27, 36) in Counties Clare and Fermanagh.

***MESOSMITTIA* Brundin, 1956**

Mesosmittia flexuella (Edwards, 1929) +

Eighteen species are recognised in *Mesosmittia* most of whose larvae are considered to be terrestrial. One species is known from European western Palaearctic countries and Great Britain and Ireland. It has not been recorded in Northern Ireland.

***Mesosmittia flexuella* (Edwards, 1929) +**

Known Irish and European distributions Figures - 381 and 382.

Status in Ireland: records from two locations in two HAs (30, 38) in Counties Donegal and Galway.

Comments: records of *Mesosmittia flexuella* in Ireland are from the north-west and west of the country only. There are no records from Northern Ireland. It is generally considered to be a terrestrial species but at one locality in Wales, adults were collected in a fully submerged emergence trap in the middle of a fast flowing mountain stream (Cranston, 1982). The species is quite widely distributed but is thus far unknown from parts of northern and central Europe and there are major gaps in eastern and southern regions. It is reasonable to expect it to occur throughout most of Europe.

METRIOCNEMUS van der Wulp, 1874

Metriocnemus (*Inermipupa*) *carmencitabertarum* Langton & Cobo, 1997 +*
Metriocnemus (*Metriocnemus*) *albolineatus* (Meigen, 1818) +*
Metriocnemus (*Metriocnemus*) *alisonae* Langton, 2013 *
Metriocnemus (*Metriocnemus*) *atriclava* Kieffer, 1921 +
Metriocnemus (*Metriocnemus*) *beringensis* (Cranston & Oliver, 1988) +
Metriocnemus (*Metriocnemus*) *cavicola* Kieffer, 1921 +*
Metriocnemus (*Metriocnemus*) *ephemerus* Langton, 2015 +*
Metriocnemus (*Metriocnemus*) *eurynotus* (Holmgren, 1883) +*
Metriocnemus (*Metriocnemus*) *fuscipes* (Meigen, 1818) +*
Metriocnemus (*Metriocnemus*) *inopinatus* Strenzke, 1950 +
Metriocnemus (*Metriocnemus*) *picipes* (Meigen, 1818) +*
Metriocnemus (*Metriocnemus*) *terrester* Pagast, Thienemann & Krüger, 1941 +
Metriocnemus (*Metriocnemus*) *tristellus* Edwards, 1929 +*
Metriocnemus (*Metriocnemus*) *ursinus* (Holmgren, 1869) +*

Metriocnemus larvae occur in a wide range of biotopes occupying habitats in moist mosses, phytotelmata (plantheld water), wet rot-holes in trees, on the margins of springs, streams and in ditches or hygropetric biotopes. Two subgenera are recognised in Europe viz. *Inermipupa* Langton and Cobo and *Metriocnemus* van der Wulp. Ashe and O'Connor (2012) cite 67 worldwide species of *Metriocnemus*, 38 in the western Palaearctic of which 24 were listed by Spies and Sæther (2013) in Fauna Europaea. An additional two species were recently described by Langton (2013, 2015c) from Northern Ireland. Currently 14 species are known from Ireland of which one is documented from Northern Ireland only and three from the Republic of Ireland only. Most of the known Irish *Metriocnemus* species are each known from less than five disjunct locations. Two species, *M. fuscipennis* and *M. eurynotus*, have been recorded more frequently at 29 and 34 locations respectively while *M. picipes* is known from 12 locations.

A more or less similar pattern is seen in Europe in that those species with a greater number of records in Ireland have a broader distribution in Europe. Conversely, species with few records in Ireland also have fewer records from European countries.

Subgenus *INERMIPUPA* Langton & Cobo, 1997

Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton & Cobo, 1997 +

Known Irish and European distributions - Figures 383 and 384.

Status in Ireland: records from 13 locations in five HAs (3, 7, 8, 9, 10) in Counties Derry, Dublin, Kildare, Meath and Wicklow.

Comments: *Metriocnemus* (*Inermipupa*) *carmencitabertarum* was first described from the Iberian Peninsula by Langton and Cobo (1997). The species is most easily recognised by its characteristic pupal exuviae. Irish records, currently from the east of the country and in Northern Ireland, are predominantly from small accumulations of

rainwater in wheelbarrows, water butts, buckets, cans, discarded motor tyres and in municipal water features. Since the pupal exuviae are so distinct, collections from such anthropogenic habitats will likely lead to additional distribution records. The species appears to be a recent immigrant to Great Britain and Ireland. Based on recent records and his studies of the life cycle of this species in the Netherlands, Kuper (2017) has outlined the case for the apparent northward migration of this species in Europe.

Since it was first described from the Iberian Peninsula (Langton and Cobo, 1997), it has been reported from the Azores (Murray *et al*., 2004), the Netherlands (Kuper and Moller-Pillot, 2012), England (Langton and Wilson, 2012; Murray, 2016d) and Ireland, including Northern Ireland (Murray, 2012, 2016c; Murray *et al*., 2014). Earlier European records from Estonia and Poland (Spies and Sæther, 2013) or Spitzbergen (Langton and Visser, 2003) are unconfirmed.

Subgenus *METRIOCNEMUS* van der Wulp, 1874

Metriocnemus* (*Metriocnemus*) *albolineatus* (Meigen, 1818) +

Known Irish and European distributions - Figures 385 and 386.

Status in Ireland: records from four locations in four HAs (3, $8, 9, 32) in Counties Derry, Dublin, Galway and $Meath. [$Murray and Ashe, 2017].

***Metriocnemus* (*Metriocnemus*) *alisonae* Langton, 2013 ***

Known Irish and European distributions - Figures 387 and 388.

This species was described from Northern Ireland by Langton (2013). To date there are no records from the Republic of Ireland or other European countries.

Status in Ireland: records from two adjacent locations at the type locality only in HA3 in County Derry.

***Metriocnemus* (*Metriocnemus*) *atriclava* Kieffer, 1921 +**

Known Irish and European distributions - Figures 389 and 390.

Status in Ireland: records from five locations in three HAs (7, 25, 32) in Counties Cavan, Offaly and Galway.

Comments: the species is known from the west and central Irish midlands. There are no records from Northern Ireland. In Europe, it is known from the Faroe Islands, Nova Zemlya (in Northern Russia), Great Britain, Norway, Sweden, Finland, France and Germany.

***Metriocnemus* (*Metriocnemus*) *beringensis* (Cranston & Oliver, 1988) +**

Known Irish and European distributions - Figures 391 and 392.

Status in Ireland: records from three locations in two HAs (18, 38) in Counties Donegal and Tipperary.

Comments: the first published record from Ireland (Murray, 1996) was as *Metriocnemus* "*beringiensis*" (note the mis-spelling of species epithet) from specimens collected in County Donegal. It is now also known from a small upland lake in the Arra Mountains, County Tipperary. There are no records from Northern

Ireland. In Europe, the species is known from Great Britain, the Netherlands, Norway, Finland, Sweden, France and Germany.

Metriocnemus* (*Metriocnemus*) *cavicola* Kieffer, 1921 +

Known Irish and European distributions - Figures 393 and 394.

Status in Ireland: records from three locations in three HAs (3, 17, 25) in Counties Derry, Waterford and Wexford.

Metriocnemus* (*Metriocnemus*) *ephemerus* Langton, 2015 +

Known Irish and European distributions - Figures 395 and 396.

Status in Ireland: records from two locations in two HAs (3 and $33) in Counties Derry and $Mayo. [$(Murray, 2017b, c)].

Comments: this species was described from Northern Ireland by Langton (2015) and was also found in 2017 on Achill Island in County Mayo in the Republic of Ireland. To date there are no other records from Europe.

Metriocnemus* (*Metriocnemus*) *eurynotus* (Holmgren, 1883) +

Known Irish and European distributions - Figures 397 and 398.

Status in Ireland: records from 29 locations, four on Clare Island and 25 in 13 HAs (1, 2, 3, 4, 7, 8, 9, 22, 25, 26, $28, 29, 33) in Counties Antrim, $Clare, Derry, Down, Galway, Kerry, Leitrim, Mayo, Meath, Tipperary and Wicklow. [$Murray and Ashe, 2017].

Comments: *Metriocnemus* (*Metriocnemus*) *eurynotus* is a commonly encountered species and has been found in lotic and lentic habitats including bog pools in Ireland. It has a widespread European distribution.

Metriocnemus* (*Metriocnemus*) *fuscipes* (Meigen, 1818) +

Known Irish and European distributions - Figures 399 and 400.

Status in Ireland: records from 34 locations, ten on Clare Island and 24 in ten HAs (3, 5, 7, 8, 9, 19, 22, 32, 33, 38) in Counties Antrim, Cavan, Cork, Derry, Donegal, Down, Dublin, Kerry, Mayo and Meath.

Comments: this is the most frequently encountered species of *Metriocnemus* in Ireland. Records are mainly from the northern half of the country. It is widespread in Europe.

Metriocnemus* (*Metriocnemus*) *inopinatus* Strenzke, 1950 +

Known Irish and European distributions - Figures 401 and 402.

Status in Ireland: records at two locations in two HAs (3, 26) in Counties Derry and Leitrim.

Comments: *Metriocnemus* (*Metriocnemus*) *inopinatus* has a restricted Irish distribution. It was first collected in Ireland in 2008 (Murray, 2010) and was more recently recorded from the River Bann in Northern Ireland in October 2016 (Peter Langton, pers. comm. to DAM). In Europe, records exist only from Finland, Germany and Moldova.

Metriocnemus* (*Metriocnemus*) *picipes* (Meigen, 1818) +

Known Irish and European distributions - Figures 403 and 404.

Status in Ireland: records from 13 locations, two on Clare Island and 11 in seven HAs (2, 3, 7, 8, 22, 26, $33) in Counties Cavan, Derry, Kerry, Mayo (Clare Island only) and Meath. [$Murray, 2017b].

***Metriocnemus* (*Metriocnemus*) *terrester* Pagast, Thienemann & Krüger, 1941+**

Known Irish and European distributions - Figures 405 and 406.

Status in Ireland: records at two locations in two HAs (9, 16) in Counties Dublin and Waterford. There are no records from Northern Ireland.

Metriocnemus* (*Metriocnemus*) *tristellus* Edwards, 1929 +

Known Irish and European distributions - Figures 407 and 408.

Status in Ireland: records from five locations in three HAs (3, 5, 26) in Counties Antrim, Derry and Roscommon.

Metriocnemus* (*Metriocnemus*) *ursinus* (Holmgren, 1869) +

Known Irish and European distributions - Figures 409 and 410.

Status in Ireland: records from three locations in three HAs (3, 5, 33) in Counties Antrim, Derry and Mayo.

NANOCLADIUS Kieffer, 1913

Nanocladius (*Nanocladius*) *balticus* (Palmén, 1959) +*

Nanocladius (*Nanocladius*) *dichromus* (Kieffer, 1906) +*

Nanocladius (*Nanocladius*) *rectinervis* (Kieffer, 1911) +*

Two subgenera are recognised in *Nanocladius*. Larvae of *Nanocladius* sensu stricto, with seven species known in the western Palaearctic, are free living while those of the subgenus *Plectopteracoluthus,* as yet unknown in the western Palaearctic, live in association with nymphs of a number of aquatic insect orders including some species of Plecoptera, Megaloptera, Heteroptera, Odonata and Ephemeroptera.

Larvae of *Nanocladius* are found in rivers, streams, lakes and ponds. Three of the seven western Palaearctic species in the subgenus *Nanocladius* are known from Ireland. All three species are quite widespread in Europe but none have been recorded from Iceland and there are gaps in the known distribution, particularly in eastern and southern Europe. The three species are likely to be encountered in all major European countries with the possible exception of Iceland although the discovery there of at least one species would not be unexpected.

Subgenus *NANOCLADIUS* Kieffer, 1913

Nanocladius* (*Nanocladius*) *balticus* (Palmén, 1959) +

Known Irish and European distributions Figures - 411 and 412.

Status in Ireland: records from 54 locations in 21 HAs (1, 3, 4, 9, 10, 19, 21, 22, 25, 26, 27, 28, 30, 31, 32, 34, 35, 36, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork,

Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Mayo, Roscommon and Wicklow.

Comments: *Nanocladius* (*Nanocladius*) *balticus* is the least frequently encountered of the three known *Nanocladius* species in Ireland. Records are predominantly from lakes and reservoirs in the north, north-west, west and south-west of the country with a small cluster of records in the east from oligotrophic lakes in the Wicklow Mountains. In Europe, *N.* (*N.*) *balticus* is known in countries from Scandinavia to Spain and Romania.

Nanocladius* (*Nanocladius*) *dichromus* (Kieffer, 1906) +

Known Irish and European distributions Figures - 413 and 414.

Status in Ireland: records from 137 locations, one on Rathlin Island and 136 in 25 HAs (3, 7, 10, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Mayo, Meath, Monaghan, Offaly, Roscommon, Waterford, Westmeath and Wicklow.

Comments: *Nanocladius* (*Nanocladius*) *dichromus* is widely distributed in lakes, rivers and streams in Ireland but there are few records from the south-east of the country with records from only two locations in County Waterford. The species is widespread in Europe.

Nanocladius* (*Nanocladius*) *rectinervis* (Kieffer, 1911) +

Known Irish and European distributions - Figures 415 and 416.

Status in Ireland: records from 168 locations in 32 HAs (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 18, 20, 21, 22, 23, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Wexford and Wicklow.

Comments: this is the most common species of *Nanocladius* and widely distributed throughout Ireland. While it is also widespread in Europe, gaps exist in its known occurrence, particularly in eastern regions (Ukraine, Poland, Belarus, most of Russia, Latvia, Lithuania, Moldova) and most of the Balkans.

ORTHOCLADIUS van der Wulp, 1874

Orthocladius (*Eudactylocladius*) *fuscimanus* (Kieffer, 1908) +*

Orthocladius (*Eudactylocladius*) *olivaceus* (Kieffer, 1911) +

Orthocladius (*Euorthocladius*) *ashei* Soponis, 1990 +*

Orthocladius (*Euorthocladius*) *rivicola* Kieffer, 1911 +*

Orthocladius (*Euorthocladius*) *rivulorum* Kieffer, 1909 +*

Orthocladius (*Euorthocladius) thienemanni* Kieffer, 1906 +*

Orthocladius (*Mesorthocladius*) *frigidus* (Zetterstedt, 1838) +*

Orthocladius (*Orthocladius*) *dentifer* Brundin, 1947 +*
Orthocladius (*Orthocladius*) *glabripennis* (Goetghebuer, 1921) +*
Orthocladius (*Orthocladius*) *oblidens* (Walker, 1856) +*
Orthocladius (*Orthocladius*) *pedestris* Kieffer, 1909 +*
Orthocladius (*Orthocladius*) *rhyacobius* Kieffer, 1911 +*
[nec *obumbratus* Johannsen, 1905]
Orthocladius (*Orthocladius*) *rivinus* Potthast, 1914 +*
Orthocladius (*Orthocladius*) *rubicundus* (Meigen, 1818) +*
Orthocladius (*Orthocladius*) *wetterensis* Brundin, 1956 +
Orthocladius (*Pogonocladius*) *consobrinus* (Holmgren, 1869) +*
Orthocladius (*Symposiocladius*) *holsatus* Goetghebuer, 1937 +
Orthocladius (*Symposiocladius*) *lignicola* Kieffer, 1914 +
Orthocladius (*Symposiocladius*) *ruffoi* Rossaro & Prato, 1991 +*

Larvae of *Orthocladius* inhabit all types of flowing water and are also found in lakes, ponds, marshes, hygropetric rock faces and occasionally in soil. Six subgenera are currently recognised and Ashe and O'Connor (2012) indicated a total of 142 described species worldwide. The listing in Fauna Europaea (Spies and Sæther, 2013) cites 49 species, including two species of uncertain generic placement. Nineteen species are known from Ireland within the six currently recognised genera.

Most species known to occur in Ireland are quite widespread in Europe but a few have been less frequently recorded. These comprise *O*. (*Eud*.) *olivaceus* which is not yet recorded from Iberia, France or Belgium most of the Balkan countries or countries or regions east of Germany; *O*. (*O*.) *dentifer* is not yet recorded from any country or region south or east of the southern Baltic Sea. There are significant gaps for *O*. (*O*.) *rivinus*, *O*. (*O*.) *wetterensis* and *O*. (*Sym*.) *ruffoi* in northern, eastern and southern Europe.

Subgenus *EUDACTYLOCLADIUS* Thienemann, 1935

Two of the eight western Palaearctic European species of *Eudactylocladius* are known from Ireland. Larvae often dominate the fauna of thin water films on hard surfaces (hygropetric habitats) but larvae of some species may also occur in lakes, ponds and inundated soil at lake margins.

Orthocladius (*Eudactylocladius*) *fuscimanus* (Kieffer, 1908) +*

Known Irish and European distributions - Figures 417 and 418.

Status in Ireland: records from 34 locations, one on Clare Island and 33 in 15 HAs (1, 2, 3, 4, 7, $9, 10, $11, 13, 20, 22, 23, 25, 26, 36) in Counties Antrim, Cork, Derry, Fermanagh, $Dublin, Galway, Kerry, Leitrim, Mayo (Clare Island only), Meath, Roscommon, Tipperary, Tyrone, Westmeath, Wexford and Wicklow. [$Record in HA11 by Murray (2017a); records in HA9 and Dublin by Murray and Ashe (2017)].

Comments: records of *Orthocladius* (*Eudactylocladius*) *fuscimanus* are from scattered locations throughout Ireland. It has been found in lakes, rivers, the

hygropetric zone of rock faces on waterfall and in artificial ponds, particularly those with fountains. The species is widespread in Europe.

***Orthocladius* (*Eudactylocladius*) *olivaceus* (Kieffer, 1911) +**

Known Irish and European distributions - Figures 419 and 420.

Status in Ireland: records from 13 locations in eight HAs (1, 21, 22, 26, 28, 31, 32, 37) in Counties Clare, Cork, Donegal, Galway, Kerry, Mayo and Westmeath.

Comments: records of this species in Ireland are from oligotrophic / mesotrophic lakes in the western half of the country. The species has a restricted distribution in Europe and there are no records from France, the Iberian Peninsula and much of the Balkans and eastern Europe.

Subgenus *EUORTHOCLADIUS* Thienemann, 1935

Euorthocladius larvae live and pupate in gelatinous tubes attached to hard surfaces or vegetation in cold springs or fast-flowing well-aerated waters of streams and rivers. Four of the currently known nine western Palaearctic species of *Euorthocladius* are on record in Ireland.

Orthocladius* (*Euorthocladius*) *ashei* Soponis, 1990 +

Known Irish and European distributions - Figures 421 and 422.

Status in Ireland: records from 13 locations in nine HAs (2, 3, 4, 9, 10, 20, 22, 32, 35) in Counties Antrim, Cork, Dublin, Kerry and Wicklow.

Comments: specimens from collections on the River Flesk, County Kerry, by Ashe (1982) in 1978 form part of the type series material of *Orthocladius* (*Euorthocladius*) *ashei*. The taxon had been recognised in Ireland for many years previously since it's characteristic pupal exuviae were known to C. F. Humphries prior to 1950 and to the senior author since 1967 (cited as "*E. flaveolus* Goetgh." in Murray, 1972), from his studies on the River Dodder, County Dublin. Records are lacking from central Ireland. The species has a widespread distribution in Europe.

Orthocladius* (*Euorthocladius*) *rivicola* Kieffer, 1911 +

Known Irish and European distributions - Figures 423 and 424.

Status in Ireland: records from 32 locations in 13 HAs (2, 3, 4, 7, 8, 9, 10, 11, 22, 25, 26, 32, 35) in Counties Antrim, Clare, Derry, Dublin, Kerry, Kildare, Leitrim, Longford, Mayo, Meath, Roscommon, Tipperary, Wexford and Wicklow.

Comments: Morgan and Murray (1988) provided the first record of this species in Ireland as *Orthocladius* (*Euorthocladius*) *luteipes* Goetghebuer based on identification of pupal exuviae from Langton (1984). However, in the subsequent determination key to pupal exuviae, Langton (1991) drew attention to the mistaken association and noted that exuviae identified as *O.* (*Euo.*) *luteipes* from his earlier key (Langton, 1984) in reality belonged to *O.* (*Euo.*) *rivicola* Kieffer. This species is now known from many locations in the country. It has a widespread European distribution.

Orthocladius* (*Euorthocladius*) *rivulorum* Kieffer, 1909 +

Known Irish and European distributions - Figures 425 and 426.

Status in Ireland: records from 20 locations in six HAs (3, 9, 12, 20, 22, 25) in Counties Cork, Derry, Kerry, Kildare, Tipperary, Wexford and Wicklow.
Comments: all records of *Orthocladius* (*Euorthocladius*) *rivulorum* in Ireland are from flowing, well aerated, waters in rivers and streams predominantly in the southern half of the country although it is known from a single record in Northern Ireland. The species is widespread in Europe.

Orthocladius* (*Euorthocladius*) *thienemanni* Kieffer, 1906 +

Known Irish and European distributions - Figures 427 and 428.
Status in Ireland: records from 21 locations in ten HAs (2, 3, 7, 9, 10, 12, 22, 26, 33, 35) in Counties Cork, Derry, Kerry, Kildare, Tipperary, Wexford and Wicklow.
Comments: in contrast with *Orthocladius* (*Euorthocladius*) *rivulorum,* records of *O.* (*Euo.*) *thienemanni* in Ireland are predominantly from rivers and streams in the northern two thirds of the island. Some records are from feeder streams or tributaries draining mountain blanket bog in the upper reaches of rivers. *O.* (*Euo.*) *thienemanni* is widely distributed in Europe but lacking records from Finland and from territories west of Russia northwards between the Adriatic and the Baltic Sea.

Subgenus *MESORTHOCLADIUS* Sæther, 2005

Two species of *Mesorthocladius* are known in the western Palaearctic, one of which is on record in Ireland.

Orthocladius* (*Mesorthocladius*) *frigidus* (Zetterstedt, 1838) +

Known Irish and European distributions - Figures 429 and 430.
Status in Ireland: records from 61 locations in 21 HAs (1, 2, 3, 4, 5, 7, 9, 10, 12, 19, 21, 22, 25, 28, 31, 32, 33, 34, 36, 38, 39) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Mayo, Wexford and Wicklow.
Comments: Irish records are predominantly from flowing waters but there are some records, as pupal exuviae, from lakes and ponds and one from a seashore at Killary, County Mayo. It is reasonable to suggest that those exuviae, collected at an atypical habitat, were passively carried to this unusual site. The species is widely distributed in western Europe.

Subgenus *ORTHOCLADIUS* van der Wulp, 1874

Eight of the 20 species in the subgenus *Orthocladius* listed from the western Palaearctic are known from Ireland.

Orthocladius* (*Orthocladius*) *dentifer* Brundin, 1947 +

Known Irish and European distributions - Figures 431 and 432.
Status in Ireland: records from 14 locations, one on Clare Island and 13 in 10 HAs (2, 3, 21, 25, 27, 28, 31, 32, 36, 37) in Counties Clare, Cork, Derry, Donegal, Down, Galway, Kerry, Mayo and Westmeath.

Comments: most Irish records of *Orthocladius* (*Orthocladius*) *dentifer* are from lakes or outflowing waters from lakes. There are no records from eastern parts of the country. It is widely distributed in western Europe.

Orthocladius* (*Orthocladius*) *glabripennis* (Goetghebuer, 1921) +

Known Irish and European distributions - Figures 433 and 434.

Status in Ireland: records from 14 locations in 11 HAs (3, 11, 15, 16, $21, 25, 26, 28, 32, 34, 38) in Counties Clare, $Cork, Derry, Donegal, Laois, Leitrim, Mayo, Wexford, and Tipperary. [$HA 11 and Wexford in Murray (2017a); HA 21 and Cork in Murray and Ashe (2017)].

Comments: records of *Orthocladius* (*Orthocladius*) *glabripennis* in Ireland are from lakes and rivers in north, west and central regions. The species has been recorded from Great Britain, Sweden and most countries of western Europe but is not known to occur in Portugal, Switzerland, Norway, Finland, Russia and parts of eastern Europe.

Orthocladius* (*Orthocladius*) *oblidens* (Walker, 1856) +

Known Irish and European distributions - Figures 435 and 436.

Status in Ireland: records from 137 locations, two on Clare Island and 135 in 29 HAs (1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 18, 20, 22, 25, 26, 28, 28, 30, 32, 33, 34, 35, 36, 38, 39, 40) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Longford, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

Comments: *Orthocladius* (*Orthocladius*) *oblidens* is one of the most commonly found species of *Orthocladius* in Ireland with numerous records from rivers throughout the island. Amongst the records from Northern Ireland however, are some from four different littoral sites around Lough Neagh. The species has a widespread distribution in western Europe but is not on record from Portugal. It has been recorded from Macedonia but thus far there are no other records from Balkan countries or from countries west of Russia northwards from the Black Sea to the Baltic Sea.

Orthocladius* (*Orthocladius*) *pedestris* Kieffer, 1909 +

Known Irish and European distributions - Figures 437 and 438.

Status in Ireland: records from 44 locations in 14 HAs (1, 2, 3, 5, 8, 9, 10, 22, 25, 31, 35, 36, 37, 39) in Counties Antrim, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Meath, Tyrone and Wicklow.

Comments: records of *Orthocladius* (*Orthocladius*) *pedestris* in Ireland are from rivers and lakes mostly in the northern half of the island but there exists a few records from the south-west in the River Caragh catchment (HA22), County Kerry. The first Irish records were as "*Orthocladius* (s. str.) Pe 10" determined from Langton (1984). The species is common in Europe but records are lacking from Sweden, Belgium, Portugal and from easternmost and south-east Europe.

Orthocladius* (*Orthocladius*) *rhyacobius* Kieffer, 1911+

[= *obumbratus* sensu Langton & Cranston, 1991]

Known Irish and European distributions - Figures 439 and 440.

Status in Ireland: records from 13 locations in seven HAs (3, 7, 10, 16, 26, 32, 35) in Counties Derry, Galway, Kerry, Mayo, Meath, Roscommon, Sligo, Tipperary and Wicklow.

Comments: early records of *Orthocladius* (*Orthcladius*) *rhyacobius* in Ireland are based on pupal exuviae identified as "*Orthocladius* (s. str.) Pe 9" from Langton (1984). In Langton and Cranston (1991), both *Orthocladius* (*O.*) Pe 9 and *Orthocladius* (*O.*) *rhyacobius* are treated as new synonyms of the Nearctic species *Orthocladius* (*O.*) *obumbratus* Johannsen, 1905. In the key to pupal exuviae of West Palaearctic Chironomidae, Langton (1991) treated the taxon under the name *Orhocladius* (*O.*) *obumbratus* Johannsen (with *O.* (*O.*) Pe 9 as a synonym) without mention of *Orthocladius* (*O.*) *rhyacobius*. Langton and Visser (2003) incorrectly treated this taxon as "*Orthocladius obumbratus* Johannsen, 1905" (with *Orthocladius* (*O.*) "pe9" and *Orthocladius* (*O.*) *rhyacobius* as synonyms). Spies and Sæther (2004) highlighted problems separating pupal exuviae of some closely relating species within *Orthocladius* s. str. and in assigning the correct taxon name. Based on Spies and Sæther (2004), Ashe and O'Connor (2012) treated *Orthocladius* (*O.*) *obumbratus* Johannsen, 1905 as a purely North American species and *O.* (*O.*) *rhyacobius* as a valid European species. The current version 2.6 of Fauna Europaea (Spies and Sæther, 2013) treats *Orthocladius* (*O.*) *obumbratus* sensu "Langton & Cranston, 1991" as a synonym of *Orthocladius* (*O.*) *rhyacobius*. In view of that, the Nearctic species *Orthocladius* (*O.*) *obumbratus* Johannsen, 1905 is not known to occur in Europe. *Orthocladius* (*O.*) *rhyacobius* is widely distributed in western Europe but due to confusion over some identifications it is doubtfully present in Norway, North European Russia, Denmark, Belgium, Luxembourg, Portugal, Greece, Hungary, Romania and the Ukraine.

Orthocladius* (*Orthocladius*) *rivinus* Potthast, 1914 +

Known Irish and European distributions - Figures 441 and 442.

Status in Ireland: records from 37 locations in 21 HAs (1, 3, 4, 7, 9, 10, 12, 22, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 38, 39) in Counties Antrim, Cavan, Clare, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Mayo, Monaghan, Roscommon, Sligo, Westmeath, Wexford and Wicklow.

Comments: Irish records of *Orthocladius* (*Orthocladius*) *rivinus* are mostly from lakes with a minority of records from flowing waters in the northern two thirds of the country. The first Irish records of this species were as "*Orthocladius* (s. str.) Pe 3" determined from Langton (1984). The species has a mainly western European distribution.

Orthocladius* (*Orthocladius*) *rubicundus* (Meigen, 1818) +

Known Irish and European distributions - Figures 443 and 444.

Status in Ireland: records from 174 locations in 30 HAs (1, 2, 3, 5, 4, 7, 9, 10, 11, 12, 15, 16, 18, 19, 20, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

Comments: *Orthocladius* (*Orthocladius*) *rubicundus* is the most commonly found *Orthocladius* species in Ireland with a distribution pattern similar to that of *O.* (*O.*) *oblidens* but it has been has been recorded from a greater number of locations. Its distribution in Europe is widespread.

***Orthocladius* (*Orthocladius*) *wetterensis* Brundin, 1956 +**

Known Irish and European distributions - Figures 445 and 446.

Status in Ireland: records from six locations in five HAs (8, 10, 16, 18, $33) in Counties Kerry, $Mayo, Meath, Tipperary and Wicklow. [$Murray, 2017b].

Comments: the few records of *Orthocladius* (*Orthocladius*) *wetterensis* in Ireland are from rivers in the east, midlands and south-west of the country. The first Irish records were as "*Orthocladius* (s. str.) Pe 8" from Langton (1984). The species is not recorded from Northern Ireland. It is known from Great Britain and most west European countries but has not been recorded from Iceland, Norway, Denmark, Belgium, the Netherlands or the Iberian Peninsula.

Subgenus *POGONOCLADIUS* Brundin, 1956

One species of *Pogonocladius* is known from the western Palaearctic that is also on record in Ireland.

Orthocladius* (*Pogonocladius*) *consobrinus* (Holmgren, 1869) +

Known Irish and European distributions - Figures 447 and 448.

Status in Ireland: records from 99 locations in 24 HAs (3, 5, 7, 9, 17, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Longford, Mayo, Roscommon, Sligo, Waterford and Westmeath.

Comments: *Orthocladius* (*Pogonocladius*) *consobrinus* is commonly found in lakes, particularly in the northern two thirds of the country. It is widely distributed in Europe but undocumented on the Iberian Peninsula and in the Balkan countries.

Subgenus *SYMPOSIOCLADIUS* Cranston, 1982

Seven species of *Symposiocladius* are known from the western Palaearctic, three of which are on record from Ireland.

***Orthocladius* (*Symposiocladius*) *holsatus* Goetghebuer, 1937 +**

Known Irish and European distributions - Figures 449 and 450.

Status in Ireland: records from 99 locations in 13 HAs (16, 17, 21, 22, 25, 26, 27, 30, 31, 32, 34, 36, 38) in Counties Cavan, Clare, Donegal, Galway, Kerry, Mayo, Roscommon, Waterford and Westmeath.

Comments: all Irish records of *Orthocladius* (*Symposiocladius*) *holsatus* are from lakes in the Republic of Ireland. Larvae are believed to feed on diatoms and species of the genus *Nostoc* (Dettinger-Klemm, 2001). The pupa was first described by C. F. Humphries from the Grosser Plöner See, Germany (Humphries, 1937). The species is mostly known from north-western countries in Europe, from France to Scandinavia.

***Orthocladius* (*Symposiocladius*) *lignicola* Kieffer, 1914 +**

Known Irish and European distributions - Figures 451 and 452.

Status in Ireland: records from seven locations in six HAs (9, 10, 15, 18, 25, 35) in Counties Dublin, Leitrim, Tipperary and Wicklow.

Comments: larvae of *Orthocladius* (*Symposiocladius*) *lignicola* mine submerged wood (alder *Alnus* spp. and hazel *Corylus* spp.) in running water. The species has a widespread distribution in Europe from countries bordering the Mediterranean northwards to Scandinavian countries.

Orthocladius* (*Symposiocladius*) *ruffoi* Rossaro & Prato, 1991 +

Known Irish and European distributions - Figures 453 and 454.

Status in Ireland: records from 16 locations in ten HAs (2, 3, 4, 19, 22, 25, 32, 34, 37, 39) in Counties Antrim, Cork, Derry, Donegal, Kerry, Limerick, Mayo and Sligo.

Comments: the majority of Irish records of *Orthocladius* (*Symposiocladius*) *ruffoi* are from rivers and streams in the north, west and south-west of the country. The species was first described in 1991 (Rossaro and Prato, 1991) but records in Ireland existed prior to then based on pupal exuviae, identified as "*Orthocladius* (s. str.) Pe 1" from Langton (1984) or as "*Rheorthocladius* sp. A, Thienemann 1944" from Langton (1991) that were associated with *O. ruffoi* by Rossaro and Prato, (1991). The species has a restricted distribution and is documented from Great Britain and Ireland, several western and central European countries and from Finland.

PARACLADIUS Hirvenoja, 1973

Paracladius conversus (Walker, 1856) +*

Larvae of *Paracladius* inhabit a variety of lotic and lentic habitats and are also found in springs. Three species are known from the western Palaearctic, one of which is on record from Ireland.

Paracladius conversus* (Walker, 1856) +

Known Irish and European distributions - Figures 455 and 456.

Status in Ireland: records from 16 locations in nine HAs (3, 7, 10, 16, 22, 25, 30, 32, 33) in Counties Clare, Derry, Galway, Kerry, Mayo, Meath, Offaly, Tipperary, Westmeath and Wicklow.

Comments: the Irish records of *Paracladius conversus* are from rivers and lakes mostly in the northern two thirds of the country. It is widespread in Europe but undocumented from Portugal, Iceland and especially parts of eastern and southern Europe. It is likely to occur almost everywhere except for very small countries or islands of limited land area but its discovery in Iceland would not be unexpected.

PARAKIEFFERIELLA Thienemann, 1936

Parakiefferiella bathophila (Kieffer, 1912) +*
Parakiefferiella coronata (Edwards, 1929) +
Parakiefferiella fennica Tuiskunen, 1986 +
Parakiefferiella scandica Brundin, 1947 +*
Parakiefferiella smolandica (Brundin, 1947) +*
Parakiefferiella "sp 1" sensu Reiss, 1968; "Pe 1" in Langton, 1991 +

Larvae of the majority of *Parakiefferiella* species are found in standing waters but some also occupy flowing water habitats. Eighteen species are on record from the western Palaearctic, five of which are known from Ireland. An undescribed species, to date known only by its distinct pupal morphotype, that was first reported from Lake Constance (Bodensee) Germany as *Parakiefferiella* sp. 1 by Reiss (1968), is also present in Ireland and is readily recognisable from its pupal exuviae identified as "*Parakiefferiella* Pe 1" in Langton (1991) and Langton and Visser (2003).

In Europe, the most widespread of the five named species are *P. bathophila* and *P. coronata*. The remaining three (*P. fennica*, *P. scandica* and *P. smolandica*) are so far restricted in their known distribution and are absent from the Iberian Peninsula (except *P. fennica*), southern and almost all of eastern Europe. It would be unsurprising if at least one species of the genus were to be discovered in Iceland.

Parakiefferiella bathophila (Kieffer, 1912) +*

Known Irish and European distributions - Figures 457 and 458.

Status in Ireland: records from 167 locations, one on Rathlin Island and 166 in 31 HAs (1, 3, 4, 7, 8, 9, 10, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Mayo, Meath, Roscommon, Sligo, Tipperary, Waterford, Westmeath and Wicklow.

Comments: this is a very common species, predominantly in lakes but also in rivers in Ireland. It is widespread in Europe.

Parakiefferiella coronata (Edwards, 1929) +

Known Irish and European distributions - Figures 459 and 460.

Status in Ireland: records from 47 locations in 14 HAs (21, 22, 25, 26, 27, 30, 31, 32, 33, 34, 35, 36, 37, 38) in Counties Clare, Donegal, Galway, Kerry, Leitrim, Mayo, Sligo and Westmeath.

Comments: records of *Parakiefferiella coronata* in Ireland are exclusively from lakes and standing waters mostly in the north-west, west and south-west of the island. Although it has not been documented from Northern Ireland, it is most likely to occur there.

***Parakiefferiella fennica* Tuiskunen, 1986 +**

Known Irish and European distributions - Figures 461 and 462.

Status in Ireland: record from one location in HA 37, County Donegal.

Comments: there is only one record of this species in Ireland from Lough Eske, an oligotrophic lake in County Donegal. The species is also known from Great Britain, Norway, Sweden and Finland, Germany, France Spain and Portugal.

Parakiefferiella scandica* Brundin, 1947 +

Known Irish and European distributions - Figures 463 and 464.

Status in Ireland: records from 12 locations in seven HAs (3, 7, 20, 21, 26, 30, 32) in Counties Cork, Derry, Galway, Kerry, Mayo, Meath, Roscommon, Tyrone and Westmeath.

Comments: records of *Parakiefferiella scandica* in Ireland are from rivers and lakes predominantly in the west, central midlands and north of the country. It was first recorded in Ireland from Northern Ireland (Langton, 2002) in the River Bann. European records to date are from Norway, Sweden, Finland, France, Germany and Slovakia.

Parakiefferiella smolandica* (Brundin, 1947) +

Known Irish and European distributions - Figures 465 and 466.

Status in Ireland: records from 34 locations in 17 HAs (1, 7, 9, 10, 21, 22, 25, 26, 27, 28, 30, 31, 32, $34, 36, 38, 39) in Counties Clare, Derry, Donegal, Galway, Kerry, Kildare, Leitrim, Mayo, Westmeath and Wicklow. [$Murray and Ashe, 2017].

Comments: all Irish records of *Parakiefferiella smolandica* are from lentic waters. The first published record from Ireland was given by Langton (2002) from Lough Veagh, County Donegal. Another record by Peter Langton from a reservoir in County Derry, Northern Ireland was cited in Murray *et al*. (2014). Elsewhere in the country most records are scattered along north-west, west and south-west regions with a few records from the east. It is also known from Great Britain, France, the Netherlands, Germany, the Czech Republic and Slovakia as well as northern areas extending fromNorway to North and East European Russia.

***Parakiefferiella* "sp 1"sensu Reiss 1968; "Pe 1" Langton, 1991 +**

Distribution - Figures are not given for this morphotype.

Status in Ireland: records from 16 locations in seven HA's (26, 27, 30, 34, 35, 36, 37) in Counties Cavan, Clare, Donegal, Leitrim, Longford, Mayo, Roscommon, Sligo and Westmeath.

Comments: records of this distinct taxon in Ireland, known from its pupal morphotype, are based on collections of pupal exuviae first described from Lake

Constance (Bodensee) by Reiss (1968). All Irish records are from lakes in the Republic of Ireland only. In Europe, the species is known in Germany from Bodensee and from Walchensee in Bavaria and is also on record from Spain (Cobo *et al*., 2002).

PARALIMNOPHYES **Brundin, 1956**

Paralimnophyes longiseta (Thienemann, 1919) +

Two species of *Paralimnophyes* are known from the western Palaearctic, one of which is documented from Ireland.

Paralimnophyes longiseta **(Thienemann, 1919) +**

Known Irish and European distributions - Figures 467 and 468.

Status in Ireland: records from four locations in three HAs (9, 30, 38) in Counties Donegal, Dublin and Galway.

Comments: larvae of *Paralimnophyes longiseta* typically inhabit enriched pools, ponds and ditches (Andersen *et al*., 2013). There are few scattered records of the species in Ireland, none from Northern Ireland but it is likely to occur there since it has been found in the bordering County Donegal in the Republic of Ireland. Records from Europe are mostly from central and western countries as well as from a few areas in the north. It is not on record from the Iberian Peninsula, Italy, the Balkan countries or elsewhere in the Mediterranean Basin and much of eastern or parts of northern Europe (including Iceland).

PARAMETRIOCNEMUS **Goetghebuer, 1932**

Parametriocnemus stylatus (Spärck, 1923) +*

Larvae of *Parametriocnemus* species are characteristic of springs and fast flowing streams and rivers. Six species are known from the western Palaearctic, one of which is on record from Ireland.

Parametriocnemus stylatus **(Spärck, 1923) +***

Known Irish and European distributions - Figures 469 and 470.

Status in Ireland: records from 188 locations, two on Clare Island and 186 in 34 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, [$]11, 12, 15, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Laois, Leitrim, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Wexford and Wicklow. [[$]Murray, 2017a].

Comments: this species has a widespread distribution throughout Ireland and has been documented from 34 of the 40 Hydrometric Areas in the country. It is very commonly found in rivers and streams but has also been collected from lakes and ponds. It is on record from all major western European countries except Iceland. The species has been recorded from Serbia Macedonia and Montenegro but thus far there are no other records from Balkan countries or from several countries or regions in

eastern Europe and it is doubtfully present in the Ukraine. It is likely to be widespread except in countries or islands of limited area that lack suitable aquatic habitats.

***PARAPHAENOCLADIUS* Thienemann, 1924**

Paraphaenocladius exagitans subsp. *monticola* Strenzke, 1950 +*
Paraphaenocladius impensus subsp. *impensus* (Walker, 1856) +*
Paraphaenocladius irritus subsp. *irritus* (Walker, 1856) +
Paraphaenocladius penerasus (Edwards, 1929) +*
Paraphaenocladius pseudirritus subsp. *pseudirritus* Strenzke, 1950 +*

Nine *Paraphaenocladius* species (including several subspecies) are known from the western Palaearctic, five of which are known from Ireland. The majority of species are terrestrial, living in damp soil adjacent to springs, streams and ditches.

Of the five Irish species (four with subspecies), the three most widely distributed in Europe are *P. impensus* subsp. *impensus*, *P. irritus* subsp. *irritus* and *P. pseudirritus* subsp. *pseudirritus*. Based on current distribution data, the remaining two species have more restricted distributions with *P. exagitans* subsp. *monticola* only known from Ireland, Norway, Finland, Germany, Luxembourg, Switzerland and Austria while doubtfully present in Great Britain and *P. penerasus* is not recorded from northern Europe. All five species are likely to be widespread in Europe.

Paraphaenocladius exagitans* subsp. *monticola* Strenzke, 1950 +

Known Irish and European distributions - Figures 471 and 472.

Status in Ireland: records from four locations in four HAs (3, 7, 22, 38) in Counties Derry, Donegal, Kerry and Meath.

Paraphaenocladius impensus* subsp. *impensus* (Walker, 1856) +

Known Irish and European distributions - Figures 473 and 474.

Status in Ireland: records from 23 locations, two on Clare Island and 21 in 12 HAs (3, 6, 7, 8, 9, 22, 26, 27, 32, 33, 34, 38) in Counties Cavan, Clare, Derry, Donegal, Dublin, Kerry, Louth, Mayo and Meath.

***Paraphaenocladius irritus* subsp. *irritus* (Walker, 1856) +**

Known Irish and European distributions - Figures 475 and 476.

Status in Ireland: records from 11 locations, one on Clare Island and ten in 12 HAs (3, 9, 22, 33, 34, 36, 38, 39) in Counties Derry, Donegal, Dublin, Kerry and Mayo.

Paraphaenocladius penerasus* (Edwards, 1929) +

Known Irish and European distributions - Figures 477 and 478.

Status in Ireland: records from five locations in five HAs (1, 7, 8, 27, 29) in Counties Clare, Derry, Donegal and Meath.

Comments: the first Irish records were from 1982 as "*Paraphaenocladius* Pe 3" determined from Langton (1984) and reported by Murray (1996).

Paraphaenocladius pseudirritus* subsp. *pseudirritus* Strenzke, 1950 +

Known Irish and European distributions - Figures 479 and 480.

Status in Ireland: records from seven locations, two on Clare Island and five in four HAs (3, 22, 32, 33) in Counties Antrim, Derry, Kerry and Mayo.

PARATRISSOCLADIUS Zavřel, 1937

Paratrissocladius excerptus subsp. *excerptus* (Walker, 1856) +*

Paratrissocladius larvae construct tubes of fine grains of sand, silt and mud in slow-flowing streams and rivers.

Paratrissocladius excerptus subsp. *excerptus* (Walker, 1856) +*

Known Irish and European distributions - Figures 487 and 488.

Status in Ireland: records from 37 locations in 15 HAs (3, 8, 10, 12, 15, 18, 20, 22, 25, 26, 32, 34, 35, 37, 39) in Counties Carlow, Clare Cork, Derry, Donegal, Kerry, Kilkenny, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Westmeath, Wexford and Wicklow.

Comments: in Europe the species is widespread but until now there are no records from Iceland, Norway, the Netherlands, parts of eastern Europe, the Balkans and some islands or island groups in the Mediterranean Sea.

PSECTROCLADIUS Kieffer, 1906

Psectrocladius (*Allopsectrocladius*) *obvius* (Walker, 1856) +*

Psectrocladius (*Allopsectrocladius*) *platypus* (Edwards, 1929) +*

Psectrocladius (*Mesopsectrocladius*) *barbatipes Kieffer, 1923*+*

Psectrocladius (*Monopsectrocladius*) *calcaratus* (Edwards, 1929) +

Psectrocladius (*Pectrocladius*) *barbimanus* (Edwards, 1929) +*

Psectrocladius (*Pectrocladius*) *bisetus* Goetghebuer, 1942+*

Psectrocladius (*Pectrocladius*) *fennicus* Storå, 1939+*

Psectrocladius (*Pectrocladius*) *limbatellus* (Holmgren, 1869) +*

Psectrocladius (*Pectrocladius*) *octomaculatus* Wülker, 1956 +

Psectrocladius (*Pectrocladius*) *oligosetus* Wülker, 1956 +?

Psectrocladius (*Pectrocladius*) *oxyura* Langton, 1985 +*

Psectrocladius (*Pectrocladius*) *psilopterus* (Kieffer, 1906) +*

Psectrocladius (*Pectrocladius*) *schlienzi* Wülker, 1956 +

Psectrocladius (*Pectrocladius*) *sordidellus* (Zetterstedt, 1838) +*

Psectrocladius (*Pectrocladius*) *ventricosus* Kieffer, 1925 +

Psectrocladius (*Pectrocladius*) "sp. A" sensu Langton, 1980 +*

Subgenus *ALLOPSECTROCLADIUS* Wülker, 1956

Four species of *Allopsectrocladius* are known from the western Palaearctic, two of which are on record from Ireland.

Psectrocladius (*Allopsectrocladius*) *obvius* (Walker, 1856) +*

Known Irish and European distributions - Figures 489 and 490.

Status in Ireland: records from 54 locations, three on Clare Island, two on Rathlin Island and 49 in 19 HAs (7, 9, 19, 21, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 36, 38, 39, 40) and Clare Island and Rathlin Island in Counties Antrim (Rathlin Island only), Clare, Cork, Donegal, Dublin, Fermanagh, Galway, Kerry, Limerick, Longford, Mayo, Meath and Roscommon.

Comments: *Psectrocladius* (*Allopsectrocladius*) *obvius* is a common species of standing waters in Ireland and has been found in lakes, reservoirs, ponds and bog pools. There are no records to date from the south-east of the country. The species is widespread in Europe (including Iceland) but with some distribution gaps particularly in the Balkans, most Mediterranean islands and a few countries in eastern Europe. Records may be expected from most major countries where it thus far unknown.

Psectrocladius* (*Allopsectrocladius*) *platypus* (Edwards, 1929) +

Known Irish and European distributions - Figures 491 and 492.

Status in Ireland: records from 26 locations, five on Clare Island and 21 in 14 HAs (3, 7, 9, 10, 19, 21, 25, 27, 32, 33, 35, 36, 37, 38) in Counties Cavan, Clare, Cork, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim, Mayo, Meath, Offaly and Wicklow.

Comments: records of *Psectrocladius* (*A.*) *platypus* in Ireland are predominantly from nutrient-poor lakes, small ponds and bog pools. There are no records from the south-east of the country. In Europe, it is mostly recorded from western and northern countries and a few Mediterranean islands but in eastern Europe it is only known from Slovakia and, North and Central European Russia. The major distribution gaps include Iceland, Switzerland, Italy, all of the Balkans, most Mediterranean islands and most of eastern Europe. The species is likely to occur in most major countries and regions.

Subgenus *MESOPSECTROCLADIUS* Laville, 1972

Psectrocladius* (*Mesopsectrocladius*) *barbatipes* Kieffer, 1923 +

Known Irish and European distributions - Figures 493 and 494.

Status in Ireland: records from 57 locations, two on Rathlin Island and 55 in 17 HAs (1, 3, 9, 20, 21, 22, 23, 26, 27, 29, 30, 31, 32, 33, 34, 36, 38) in Counties Antrim (Rathlin Island only), Cavan, Clare, Cork, Donegal, Dublin, Galway, Kerry, Leitrim, Mayo, Monaghan, Sligo and Westmeath.

Comments: the majority of records of this species in Ireland are from lakes, ponds and bog pools predominantly in the north, west and south-west of the country with some scattered records in the east and the midlands. In Europe, it is known from western, central and northern countries including Ireland, Great Britain, Norway, Sweden, Finland, Denmark, Germany, the Czech Republic, Slovakia, France and Portugal. Its occurrence in Portugal and North Africa (Morocco) indicates that it can be expected elsewhere in southern Europe and likely to be found in most major countries of eastern Europe.

Subgenus *MONOPSECTROCLADIUS* Wülker, 1956

Psectrocladius (*Monopsectrocladius*) *calcaratus* (Edwards, 1929) +

Known Irish and European distributions - Figures 495 and 496.

Status in Ireland: records from 26 locations in ten HAs (9, 19, 21, 30, 31, 32, 33, 35, 37, 38) in Counties Cork, Donegal, Dublin, Galway, Kerry, Leitrim and Mayo.

Comments: all Irish records of this species are from standing waters in lakes, pools and bog ponds in the south-west, west and north-west of the country. There are no records from Northern Ireland. The European distribution of this species is somewhat sporadic. It is known from parts of western, northern, eastern and southern Europe. However, there are significant gaps including the Iberian Peninsula, a large area extending from Germany to Italy, parts of the Balkans and much of eastern Europe. It can be expected to occur in most major countries of southern, central and eastern Europe where it is so far unknown.

Subgenus *PSECTROCLADIUS* Kieffer, 1906

Twenty one species of *Psectrocladius* are known from the western Palaearctic, eleven of which are known from Ireland. An additional undescribed species that is known from England as "*Psectrocladius* (*Ps*.) sp A" from Langton (1980) and as "*Psectrocladius* (s. str.) Pe sp.A" in the determination keys to pupae by Langton (1984, 1991) and Langton and Visser (2003) and as "*Psectrocladius* (*P*.) sp. A" in the keys to adult males by Langton and Pinder (2007) is also on record from Ireland.

Psectrocladius (*Psectrocladius*) *barbimanus* (Edwards, 1929) +*

Known Irish and European distributions Figures 497 and 498.

Status in Ireland: records from 14 locations in 12 HAs (3, 7, 9, 19, 21, 22, 24, 27, 30, 32, 35, 38) in Counties Cavan, Clare, Cork, Derry, Dublin, Galway, Kerry, Limerick and Sligo.

Comments: there are scattered records of *Psectrocladius* (*Psectrocladius*) *barbimanus* in lakes and ponds from different regions of Ireland, including Northern Ireland. Its European distribution is widespread (including Iceland), but there are no records from Portugal, Belgium, Luxemburg, most Mediterranean islands, parts of the Balkans and much of eastern Europe. It can be expected to occur in all major European countries and regions.

Psectrocladius (*Psectrocladius*) *bisetus* Goetghebuer, 1942 +*

Known Irish and European distributions - Figures 499 and 500.

Status in Ireland: records from eight locations in six HAs (3, 10, 26, 36, 37, 38) in Counties Derry, Donegal, Leitrim and Wicklow.

Comments: there are few records of *Psectrocladius* (*Psectrocladius*) *bisetus* from locations primarily in the north-west of Ireland, including Northern Ireland. It is also known from one location in the Wicklow Mountains in the east. It has a distribution predominantly in the northern and western Europe but with relatively few records from eastern Europe (Czech Republic, Kaliningrad and Romania). Moller-Pillot

(2013) noted that the larvae live among aquatic plants and *Sphagnum* in small, polyhumic, more or less boggy lakes and moorland pools. It has not been recorded from Spain or Portugal or elsewhere in southern Europe (apart from Romania) but ecological data indicates that it can be expected throughout eastern and northern Europe. However, in southern Europe it may be restricted to suitable boggy lakes and moorland pools located at higher altitude.

Psectrocladius* (*Psectrocladius*) *fennicus* Storå, 1939 +

Known Irish and European distributions - Figures 501 and 502.

Status in Ireland: records from 34 locations in 15 HAs (1, 19, 21, 22, 27, 28, 30, 31, 32, 33, 35, 37, 38, 39, 40) in Counties Clare, Cork, Donegal, Galway, Kerry, Mayo, Sligo and Tyrone.

Comments: records of *Psectrocladius* (*Psectrocladius*) *fennicus* in Ireland are confined to the west of the country from the north-west, including Northern Ireland, southwards to the south-west of the island. The European distribution is primarily northern and western while the records from Italy are from the Alpine region. Records are lacking from all of eastern and southern Europe and the Balkans. It is generally associated with lakes and pools in Scandinavia, the British Isles and the Alps indicating that, if it occurs in southern Europe, it may be restricted to suitable cooler lake and pool habitats at higher altitude but it can be expected from most major countries and regions of eastern Europe.

Psectrocladius* (*Psectrocladius*) *limbatellus* (Holmgren, 1869) +

Known Irish and European distributions - Figures 503 and 504.

Status in Ireland: records from 43 locations, one on Clare Island, two on Rathlin Island and 40 in 22 HAs (1, 2, 3, 7, 8, 9, 10, 17, 20, 21, 25, 26, 27, 28, $29, 30, 32, $33, 34, 36, 37, 38) in Counties Antrim (Rathlin Island only) Clare, Cork, Derry, Donegal, Dublin, Galway, Kerry, Leitrim, Mayo , Meath, Offaly, Sligo, Waterford and Wicklow. [$Record in HA29 by Murray and Ashe (2017); record in HA33 by Murray (2017b)].

Comments: Irish records of *Psectrocladius* (*Psectrocladius*) *limbatellus* are exclusively from lakes and bog pools. Most of the records are from the northern half of the country with single locality records from lakes in the south in Counties Waterford and Kerry and recently from an artificial pond at Rathmore, County Cork (Murray, 2016). The species is widespread in Europe (including Iceland) but there are significant gaps as there are no records from the Balkans, most Mediterranean islands and part of eastern Europe. It can be expected to occur in all major European countries and regions.

***Psectrocladius* (*Psectrocladius*) *octomaculatus* Wülker, 1956 +**

Known Irish and European distributions - Figures 505 and 506.

Status in Ireland: records at three locations in two HAs (32, 38) in Counties Donegal and Mayo.

Comments: the records in Ireland are from acidic bog pools. It has quite a widespread European distribution but lacking records from Denmark, Belgium, Luxembourg, Austria, most of the Mediterranean islands, the Balkans, most of eastern Europe and including Russia. Records may be expected from many of these countries and regions.

***Psectrocladius* (*Psectrocladius*) *oligosetus* Wülker, 1956 +?**

Known Irish and European distributions - Figures 507 and 508.

Status in Ireland: records from 19 locations, one on Clare Island and 18 in nine HAs (20, 22, 27, 28, 30, 31, 32, 36, 38) in Counties Clare, Cork, Donegal, Galway, Kerry, Mayo and Monaghan.

Comments: Murray *et al*. (2016) indicated that the record by Langton (2002) of *Psectrocladius* (*Psectrocladius*) *oligosetus* from County Donegal, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Thus, while it is likely to occur, there are no records of the species to date from Northern Ireland.

Psectrocladius* (*Psectrocladius*) *oxyura* Langton, 1985 +

Known Irish and European distributions - Figures 509 and 510.

Status in Ireland: records from 41 locations in 18 HAs (1, 2, 3, 4, 19, 23, 25, 26, 27, 30, 31, 32, 34, 35, 36, 37, 38, 40) in Counties Antrim, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo , Roscommon, Sligo and Tyrone.

Comments: *Psectrocladius* (*Psectrocladius*) *oxyura* is mostly known from the western half of Europe extending from Scandinavia to the British Isles and southwards to Italy, Spain and Corsica but in eastern Europe it has been found only in Slovakia and Hungary. The species may be expected to occur in most major European countries and regions.

Psectrocladius* (*Psectrocladius*) *psilopterus* (Kieffer, 1906) +

Known Irish and European distributions - Figures 511 and 512.

Status in Ireland: records from 119 locations, one on Clare Island and 118 in 25 HAs (4, 9, 10, [$]11, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Mayo , Roscommon, Sligo, Tipperary, Westmeath, [$]Wexford and Wicklow. [[$]Murray, 2017].

Comments: this species is widespread in Europe but there are some gaps in its distribution which includes all Mediterranean islands, most of the Balkans and a few countries in both western and eastern Europe. It can be expected to occur in almost all major European countries and regions.

***Psectrocladius* (*Psectrocladius*) *schlienzi* Wülker, 1956 +**

Known Irish and European distributions - Figures 513 and 514.

Status in Ireland: records from two locations in two HAs (10, 38) in Counties Donegal and Wicklow. There are no records from Northern Ireland.

Comments: Irish records of *Psectrocladius* (*Psectrocladius*) *schlienzi* are from mountain lakes in the north-west and east of the country. The species has a somewhat patchy distribution in Europe that includes Fennoscandia, the British Isles and countries extending southwards from Denmark to Italy as well as Iberian Peninsula and Moldova. Gaps in its distribution in the west include Iceland, France, Belgium and Luxembourg, all Mediterranean islands, all of the Balkans, all of European Russia and most of eastern Europe (except Slovakia and Moldova). Its occurrence in Portugal indicates that the species can be expected elsewhere in southern Europe and in most major countries of western, eastern and northern Europe in which it is thus far unknown.

Psectrocladius* (*Psectrocladius*) *sordidellus* (Zetterstedt, 1838) +

Known Irish and European distributions - Figures 515 and 516.

Status in Ireland: records from 88 locations, one each on Clare Island and Rathlin Island and 86 in 27 HAs (1, 3, 4, 7, $9, 10, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Clare, Cork, Derry, Donegal, $Dublin, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Mayo, Roscommon, Sligo, Waterford, Westmeath and Wicklow. [$Murray and Ashe, 2017].

Comments: *Psectrocladius* (*Psectrocladius*) *sordidellus* is a common species in Ireland that is known from much of Europe except Iceland, Luxembourg, Slovenia, most Mediterranean islands, parts of the Balkans and a few countries of eastern Europe while the species is doubtfully present in the Ukraine. *P.* (*P.*) *sordidellus* can be expected to occur in almost all major European countries and regions.

***Psectrocladius* (*Psectrocladius*) *ventricosus* Kieffer, 1925 +**

Known Irish and European distributions - Figures 517 and 518.

Status in Ireland: records from three locations, two on Clare Island and one in HA 32 in County Mayo.

Comments: the only records of *Psectrocladius* (*Psectrocladius*) *ventricosus* in Ireland are from the west of the country from a coastal lake in County Mayo and from the nearby Clare Island in Clew Bay. The species appears to have a very patchy European distribution that includes the British Isles, Spain, northern Europe (Sweden, Finland, Svalbard and Jan Mayen), central Europe (Denmark, the Netherlands, Germany and Austria) and eastern Europe (Moldova, the Ukraine and South European Russia). Its occurrence in North Africa (Morocco) and the Near East (Azerbaijan) indicates that *P.* (*P.*) *ventricosus* can be expected from southern Europe. It is likely to occur in almost all major European countries and regions.

Psectrocladius* (*Psectrocladius*) "sp A" sensu Langton, 1980 +

Distribution - Figures are not given for this morphotype.

Status in Ireland: records from 22 locations in 13 HA's (4, 10, 18, 21, 22, 26, 28, 32, 33, 34, 35, 38, 39) in Counties Antrim, Clare, Donegal, Galway, Kerry, Leitrim, Mayo,

Tipperary and Wicklow.

Comments: the characteristic pupal exuviae of this undescribed species have been known in Great Britain (Scotland and Wales) since 1980 (Langton, 1980) and in Ireland since 1982 (Murray *et al.,* 2014). The exuviae are keyed in Langton (1984, 1991) as "*Psectrocladius* (s. str.) Pe sp.A" and as "*Psectrocladius* (*Psectrocladius*) pe-spec-a" in Langton and Visser (2003). The adult male is known but undescribed and is identified as "*Psectrocladius* (*P.*) sp. A" in the keys to adult male Chironomidae of Britain and Ireland by Langton and Pinder (2007).

PSEUDORTHOCLADIUS Goetghebuer, 1943

Pseudorthocladius (*Pseudorthocladius*) *curtistylus* (Goetghebuer, 1921) +*

Pseudorthocladius (*P.*) *filiformis* (Kieffer, 1908) +*

Pseudorthocladius (*P.*) *macrovirgatus* Sæther & Sublette, 1983 +*

Pseudorthocladius (*P.*) *rectangilobus* Caspers & Siebert, 1980 +*

Pseudorthocladius larvae are semi-terrestrial and are typically found in moist mosses, including *Sphagnum* spp., in hygropetric habitats and in the margins of spring-fed streams. Two subgenera are recognised, *Lordella* Sæther and Sublette, 1983 which is known from the Nearctic Region only, and the nominal subgenus *Pseudorthocladius* that has records of some 51 species from the Nearctic, Palaearctic, Afrotropical and Oriental regions (Ashe and O'Connor, 2012). Thirty four species are known from the Palaearctic of which eight are known from western Europe. Four species are on record from Ireland.

Subgenus *PSEUDORTHOCLADIUS* Goetghebuer, 1943

Pseudorthocladius (*Pseudorthocladius*) *curtistylus* (Goetghebuer, 1921) +*

Known Irish and European distributions -Figures 519 and 520.

Status in Ireland: records from five locations, one each on Clare Island and Rathlin Island and three in three HAs (6, 21, 22) in Counties Antrim (Rathlin Island only), Cork, Kerry, Louth and Mayo (Clare Island only).

Comments: Irish records of *Pseudorthocladius* (*Pseudorthocladius*) *curtistylus* are from bog ponds and seepages at scattered locations around throughout the country, two of which are on off-shore islands. The species is widely distributed in Europe but there are no records to date from Iceland, Portugal, parts of eastern Europe, the Balkans (except Greece) and most Mediterranean islands.

Pseudorthocladius (*Pseudorthocladius*) *filiformis* (Kieffer, 1908) +*

Known Irish and European distributions - Figures 521 and 522.

Status in Ireland: records from 25 locations, six on Clare Island, one on Rathlin Island and 18 in ten HAs (9, 10, 22, 30, 31, 32, 33, 35, 37, 38) in Counties Antrim (Rathlin Island only), Donegal Dublin, Galway, Cork, Kerry, Leitrim and Mayo.

Comments: records of *Pseudorthocladius* (*Pseudorthocladius*) *filiformis* in Ireland are from bog ponds and seepages, small rivers bordering peatlands or from the margins of oligotrophic lakes. The species is documented from most western European countries but not recorded in Iceland, Italy and countries east of central Europe.

Pseudorthocladius* (*Pseudorthocladius*) *macrovirgatus* Sæther & Sublette, 1983 +

Known Irish and European distributions - Figures 523 and 524.

Status in Ireland: records from nine locations, two on Clare Island and seven in six HAs (3, 9, 22, 32, 35, 38) in Counties Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim and Mayo (Clare Island only).

Comments: some records of this species in Ireland were previously given as *Pseudorthocladius cranstoni* in Heneghan and Murray (1987) that is now a synonym of *P.* (*P.*) *macrovirgatus*. Irish records are from bog waters apart from the record in Northern Ireland from the River Bann and Lough Erne by P. H. Langton (Murray *et al*., 2014). The species has a restricted European distribution and is known to date from Ireland, Great Britain, Norway, the Netherlands and France.

Pseudorthocladius* (*Pseudorthocladius*) *rectangilobus* Caspers & Siebert, 1980 +

Known Irish and European distributions - Figures 525 and 526.

Status in Ireland: records from five locations in two HAs (36, 38) in Counties Donegal and Fermanagh.

Comments: the Irish records are from the north-west of the country only. It was first reported from Glenveagh, County Donegal (Murray, 1996) and subsequently recorded (PHL) from Lough Erne, County Fermanagh in Northern Ireland (Murray *et al*., 2014). Records of this species in Europe are sparse. It was described originally from Germany and has since been documented only in Norway and Ireland.

PSEUDOSMITTIA Edwards, 1932

Pseudosmittia albipennis (Goetghebuer, 1921) +*

Pseudosmittia angusta (Edwards, 1929) +

Pseudosmittia obtusa Strenzke, 1960 *

Pseudosmittia trilobata (Edwards, 1929) +

Most species of *Pseudosmittia* are semi-terrestrial or semiaquatic. Eighteen species are known from the western Palaearctic four of which are documented from Ireland Since these semi-terrestrial habitats are poorly investigated in Ireland, records of the four known species are sparse.

Pseudosmittia albipennis* (Goetghebuer, 1921) +

Known Irish and European distributions - Figures 527 and 528.

Status in Ireland: records from four locations, in four HAs (4, 22, 31, 38) in Counties Antrim, Donegal, Galway and Kerry.

Comments: the few records from Ireland include one by Edwards (1929) from Killarney, County Kerry. Other European records are from Great Britain, Norway, Finland, Denmark, Belgium, Luxembourg, Germany and France. It is noted as doubtfully present in the Netherlands and Switzerland.

***Pseudosmittia angusta* (Edwards, 1929) +**

Known Irish and European distributions - Figures 529 and 530.

Status in Ireland: a single Irish record in HA 18, County Tipperary.

Comments: *Pseudosmttia angusta* is known in the Republic of Ireland only from Lough Curra, an upland lake in the Galtymore Mountains (Murray and Baars, 2006a). It has a broad but sporadic distribution in Europe with significant gaps in eastern and southern Europe (including the Iberian Peninsula). The current distribution indicates that it could be a widespread European species.

***Pseudosmittia obtusa* Strenzke, 1960 ***

Known Irish and European distributions - Figures 531 and 532.

Status in Ireland: there is a single Irish record from Rathlin Island (County Antrim). The species is thus far not known from the Republic of Ireland.

Comments: the only known Irish record of *Pseudosmittia obtusa* is from Northern Ireland (Langton, 2005; Murray *et al*., 2014). In Europe, it has a relatively broad but sporadic distribution with records from Great Britain, Norway, Sweden, Finland, East European Russia, Germany, the Netherlands and Italy but doubtfully present in Denmark, Poland, Estonia, Slovakia and Spain. It is likely to be a widespread European species.

***Pseudosmittia trilobata* (Edwards, 1929) +**

Known Irish and European distributions - Figures 533 and 534.

Status in Ireland: records from two locations, one on Clare Island and one in HA33 in County Mayo.

Comments: both Irish records of this species are from bog pools in the west of Ireland. Most records of this species in Europe are from western, central and northern regions but with major gaps particularly in eastern and southern Europe. It is doubtfully present in Norway, Denmark, the Netherlands, Poland, Slovakia, Estonia, Italy and Spain. It is likely to occur throughout most of Europe.

RHEOCRICOTOPUS Brundin, 1956

Rheocricotopus (*Psilocricotopus*) *atripes* (Kieffer, 1913) +*

Rheocricotopus (*P.*) *chalybeatus* subsp. *chalybeatus* (Edwards, 1929) +*

Rheocricotopus (*P.*) *glabricollis* (Meigen, 1830) +

Rheocricotopus (*P.*) *tirolus* Lehmann, 1969 +

Rheocricotopus (*Rheocricotopus*) *effusus* (Walker, 1856) +*

Rheocricotopus (*R.*) *fuscipes* (Kieffer, 1909) +*

Rheocricotopus larvae are rheophilic, living on aquatic vegetation. They are predominantly found in rivers and streams and are occasionally, but rarely, found in lake littoral zones. Twelve species in two subgenera of *Rheocricotopus* occur in the western Palaearctic. Four of the eight species of *Psilocricotopus* Sæther occur in Ireland along with two of the three species of *Rheocricotopus* Brundin.

Subgenus *PSILOCRICOTOPUS* Sæther, 1986

Rheocricotopus* (*Psilocricotopus*) *atripes* (Kieffer, 1913) +

Known Irish and European distributions - Figures 535 and 536.

Status in Ireland: records from six locations in six HAs (1, 7, $11, 21, 23, 36) in Counties Derry, Kerry, Leitrim, Wexford and Meath. [$Murray, 2017a].

Comments: the few records of *Rheocricotopus* (*Psilocricotopus*) *atripes* from Ireland are from rivers and upland lakes in the south-west, east and north-west of the country. The first published record of the species was from Northern Ireland by Langton (2004a) but the species was first collected in 1981 in County Meath. It is widely distributed in the western half of Europe but there are significant gaps in its distribution in eastern Europe, the Balkans and southern Europe. It is likely to be a widely distributed species throughout most of Europe.

Rheocricotopus* (*Psilocricotopus*) *chalybeatus chalybeatus* (Edwards, 1929) +

Known Irish and European distributions - Figures 537 and 538.

Status in Ireland: records from 74 locations, one on Clare Island and 73 in 21 HAs (2, 3, 7, 10, 12, 15, 18, 20, 21, 22, 25, 26, 28, 30, 32, 33, 34, 35, 37, 38, 39) in Counties Antrim, Clare, Cork, Derry, Donegal, Galway, Kerry, Kilkenny, Laois, Galway, Mayo (including Clare Island), Meath, Offaly, Roscommon, Sligo, Waterford, Wexford and Wicklow.

Comments: this is a widespread and commonly encountered species and subspecies in Ireland. It is also widely distributed in Europe but lacking records in Iceland, Norway, Sweden, some Baltic countries, parts of the Balkans, eastern and southern Europe.

***Rheocricotopus* (*Psilocricotopus*) *glabricollis* (Meigen, 1830) +**

Known Irish and European distributions - Figures 539 and 540.

Status in Ireland: records from five locations in four HAs (7, $11, 20, 22) in Counties Cork, Kerry, $Wexford and Meath. [$Murray, 2017].

Comments: *Rheocricotopus* (*Psilocricotopus*) *glabricollis* has been rarely encountered in Ireland. Records exist only from the south-west, south-east and east of the country and there are no records from the west or northern regions, including Northern Ireland. It is known from most countries in the western region of Europe but in the east there are no records in a broad expanse of land extending from northern Russia to the Black Sea and from the borders of Poland and Hungary south to the Balkans (except for Macedonia) and the eastern Mediterranean. It is, however, likely to prove to be a widespread species.

***Rheocricotopus* (*Psilocricotopus*) *tirolus* Lehmann, 1969 +**

Known Irish and European distributions - Figures 541 and 542.

Status in Ireland: records from one location in HA 21, County Kerry.

Comments: there are few records of *Rheocricotopus* (*Psilocricotopus*) *tirolus* as pupal exuviae collected on two separate occasions from a small mountain lake in south-west Ireland (Murray, 2010). It is likely that the exuviae were passively carried in inflowing streams to the lake. Most European records are from the western regions but the only records so far from the east are from Slovakia and Cyprus. Its occurrence in Portugal, Cyprus and North Africa as well as Norway indicates that it is likely to be a widespread species with additional records expected from southern, eastern and northern Europe.

Subgenus *RHEOCRICOTOPUS* Brundin, 1956

Rheocricotopus* (*Rheocricotopus*) *effusus* (Walker, 1856) +

Known Irish and European distributions - Figures 543 and 544.

Status in Ireland: records from 25 locations in 14 HAs (1, 2, 3, 4, 7, 8, 10, [$]11, 16, 19, 20, 26, 35, 36) in Counties Antrim, Armagh, Cork, Derry, Fermanagh. Leitrim, Meath, Roscommon, Tipperary, Tyrone, Wexford and Wicklow. [[$]Murray, 2017a].

Comments: this is a common species in rivers and streams and also in ponds and small lakes. It is a widespread European species (including Iceland) but with some gaps mostly in the eastern Mediterranean countries, most of the Balkans and parts of eastern Europe and is doubtfully present in the Ukraine. It is likely to occur throughout most of Europe.

Rheocricotopus* (*Rheocricotopus*) *fuscipes* (Kieffer, 1909) +

Known Irish and European distributions - Figures 545 and 546.

Status in Ireland: records from 108 locations in 21 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 19, 20, 22, 25, 26, 30, 32, 36, 39) in Counties Antrim, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Laois, Leitrim, Louth, Galway, Mayo, Meath, Monaghan, Tipperary, Tyrone Wexford and Wicklow.

Comments: *Rheocricotopus* (*Rheocricotopus*) *fuscipes* has a widespread distribution in Ireland and is most commonly encountered in streams and rivers but occasionally in lakes. While it is not known from Iceland, records exist from most countries in the western half of Europe but with significant gaps in eastern Mediterranean countries, the Balkans and parts of eastern Europe and it is doubtfully present in the Ukraine. It is likely to occur in most European countries.

RHEOSMITTIA Brundin, 1986

Rheosmittia spinicornis (Brundin, 1956) +

Two species of *Rheosmittia* are known from the western Palaearctic, one of which is known in Ireland. Larvae are psammophilous, living in fine sandy substrates of rivers.

Rheosmittia spinicornis (Brundin, 1956) +

Known Irish and European distributions - Figures 547 and 548.

Status in Ireland: records from seven locations in three HAs (12, 15, 34) in Counties Laois, Mayo and Wicklow.

Comments: Irish records are from rivers in the midlands with one record from the west of the country. There are no records to date from Northern Ireland. It is widespread in Europe but is thus far unknown from Iceland, the Netherlands, Belgium, Luxemburg, Switzerland and Portugal. There are significant gaps in its known distribution in eastern Europe and the Balkans and there are no records from any of the Mediterranean islands.

SMITTIA Holmgren, 1869

Smittia amoena Caspers, 1988 *
Smittia aterrima (Meigen, 1818) +*
Smittia contingens (Walker, 1856) +*
Smittia edwardsi Goetghebuer, 1932 +*
Smittia leucopogon (Meigen, 1804) +*
Smittia nudipennis (Goetghebuer, 1913) +
Smittia pratorum (Goetghebuer, 1927) +*
Smittia superata Goetghebuer, 1939 *

Larvae of the genus *Smittia* are primarily terrestrial living in damp soils, frequently in compost heaps and occasionally in soil in greenhouses. It is a large genus with some 36 species currently known in the western Palaearctic but it is very likely that there are many additional undescribed species. Eight species are on record from Ireland.

Smittia amoena Caspers, 1988 *

Known Irish and European distributions - Figures 549 and 550.

Status in Ireland: record from one location in HA 3 in County Derry.

Comments: first described from Germany, *Smittia amoena* was recorded by Langton (2012a) from Northern Ireland. It is not yet known from the Republic of Ireland thus the citation in Spies and Sæther (2013) is in error (Murray *et al*. 2016). It is known from Great Britain and is doubtfully present in Finland and Italy. It is likely to be much more widespread than the few records indicate especially if the uncertain records from Finland and Italy are confirmed.

Smittia aterrima (Meigen, 1818) +*

Known Irish and European distributions - Figures 551 and 552.

Status in Ireland: records from nine locations in six HAs (3, 7, 8, 19, 25, 33) in Counties Cork, Derry, Mayo, Meath and Westmeath.

Comments: this species is known from Iceland and is widespread in Europe but with some gaps including Portugal, most of the Balkans, most islands in the Mediterranean

Sea and parts of eastern Europe. It is likely to occur throughout most of Europe with the possible exception of countries or islands with very limited land area.

Smittia contingens* (Walker, 1856) +

Known Irish and European distributions - Figures 553 and 554.

Status in Ireland: records from ten locations in seven HAs (3, 7, 8, 9, $12, 22, 33) in Counties Derry, Dublin, Kerry, Mayo, Meath and $Wexford. [$Murray, 2017a)].

Comments: there are sporadic records in Ireland but none from the midlands or south-west of the country. It is a quite widely but sporadicaly distributed species in Europe. It is not recorded from Iceland or parts of northern, eastern and southern Europe while it is doubtfully present in the Ukaine. However, it can be expected to occur in most major European countries.

Smittia edwardsi* Goetghebuer, 1932 +

Known Irish and European distributions - Figures 555 and 556.

Status in Ireland: records from seven locations in five HAs (3, 8, 9, 33, 38) in Counties Derry, Donegal, Dublin, Mayo and Meath.

Comments: the few records in Ireland of *Smittia edwardsi* are from the east, west and north (Northern Ireland) of the country. It is known from central and northern Europe. It is also known from Italy but because that record is from the northern part of the country (Boorman *et al*., 1995), its presence in southern Europe or the Mediterranean Basin is unlikely. Whether or not its absence so far from southern Europe is a true reflection of its actual distribution is unclear but at the very least the species is liable to be widely distributed in northern and central Europe.

Smittia leucopogon* (Meigen, 1804) +

Known Irish and European distributions - Figures 557 and 558.

Status in Ireland: records from three locations in three HAs (3, 7, 8) in Counties Antrim and Meath.

Comments: this species has been rarely encoutred in Ireland and is only known from the east of the country and in Northern Ireland. Its European distribution is similar to *Smittia edwardsi* (see above) in that it is known from the central and northern half of Europe and similarly, since the Italian record is probably from northern Italy it is likely that there are no confirmed records from southern Europe. The species is likely to be widely distributed in northern, eastern and central Europe but its occurrence in Lebanon indicates that its discovery in southern Europe would not be surprising.

***Smittia nudipennis* (Goetghebuer, 1913) +**

Known Irish and European distributions - Figures 559 and 560.

Status in Ireland: record from one location in HA 10, County Wicklow.

Comments: there is a single record of *Smittia nudipennis* from the Republic of Ireland but there are no records from Northern Ireland. The species is widespread especially in northern, western and central Europe but while there are no records from

the Iberian Peninsula its occurrence in Corsica indicates that it could be expected there and elsewhere in southern Europe.

Smittia pratorum* (Goetghebuer, 1927) +

Known Irish and European distributions - Figures 561 and 562.

Status in Ireland: records from 17 locations, two on Clare Island and 15 in seven HAs (2, 3, 4, 7, 8, 22, 26) in Counties Antrim, Cavan, Derry, Galway, Kerry, Mayo (Clare Island only) and Meath.

Comments: records of *Smittia pratorum* are sporadic in Ireland but it is not known to occur in the south-east or south of the country. Records in Europe are mostly from western and northern regions but its occurrence on Corsica and in parts of eastern Europe indicates that it will prove to be widespread with more collecting effort in poorly known regions.

***Smittia superata* Goetghebuer, 1939 ***

Known Irish and European distributions - Figures 563 and 564.

Status in Ireland: record from one location in HA 3, County Derry, Northern Ireland. There are no records from the Republic of Ireland.

Comments: *Smittia superata* is also known from Great Britain, Sweden, parts of central Europe and Romania. There are no records from Iceland, the Iberian Peninsula Italy, most of eastern Europe or the Balkan countries. However, it can be expected in most major European countries.

***SYNORTHOCLADIUS* Thienemann, 1935**

Synorthocladius semivirens (Kieffer, 1909) +*

Larvae of *Synorthocladius* live in spring waters, streams, rivers and in the littoral zone of lakes. One species is known in the western Palaearctic.

Synorthocladius semivirens* (Kieffer, 1909) +

Known Irish and European distributions - Figures 565 and 566.

Status in Ireland: records from 420 locations, three on Clare Island and 417 in 36 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, [$]11, 12, 13, 15, 16, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Waterford, Westmeath, Wexford and Wicklow. [[$]Murray, 2017a].

Comments: *Synorthocladius semivirens* is the most commonly encountered chironomid species in rivers and lakes throughout Ireland. It is also widespread in Europe but with some gaps in its distribution. It is not known from Iceland, parts of eastern and south-eastern Europe and particularly some eastern islands of the Mediterranean Sea.

THALASSOSMITTIA Strenzke & Remmert, 1957

Thalassosmittia thalassophila (Bequaert & Goetghebuer, 1914) +*

Two species of *Thalassosmittia,* whose larvae live in the tidal zone of marine littoral habitats, are known from the western Palaearctic. One species is on record in Ireland.

Thalassosmittia thalassophila (Bequaert & Goetghebuer, 1914) +*

Known Irish and European distributions - Figures 567 and 568.

Status in Ireland: records from 18 coastal locations, four on Clare Island and 14 in nine HAs (3, 8, 9, 13, $20, 27, 31, 32, $33) in Counties Clare, $Cork, Derry, Dublin, Galway, Mayo and Wexford. [$HA20 and Cork in Murray (2016b); HA33 in Murray (2017b)].

Comments: *Thalassosmittia thalassophila* is on record from coastal locations around Ireland apart from the north-western coast. It is known from western and southern European marine coasts on the British Isles, and on Atlantic coastlines extending from the shores of the German North Sea to the Iberian Peninsula (including a recent record from Portugal by Murray (2015d)) and Mediterranean coastlines of Italy as well as Corsica, Croatia and Greece and the Black Sea coast of Romania. It is not clear whether or not the absence to date of records from coastal habitats of Iceland, the Baltic Sea, Denmark, Fennoscandia and northern Russia are due to lower sampling effort or if the species favours warmer marine waters. Its occurrence on the German North Sea indicates that records of the species can be expected from the Danish North Sea coast.

THIENEMANNIA Kieffer, 1909

Thienemannia gracilis Kieffer, 1909 +

Larvae of *Thienemannia* are predominantly found in springs and hygropetric zones. Five species are known from the western Palaearctic, one of which occurs in Ireland

Thienemannia gracilis Kieffer, 1909 +

Known Irish and European distributions - Figures 569 and 570.

Status in Ireland: records from two locations, one on Clare Island and one in HA 38 in Counties Donegal and Mayo (Clare Island only).

Comments: there are only two records of *Thienemannia gracilis* from Ireland, one from the mainland in the north-west of the country and one from Clare Island off the west coast. There are no records from Northern Ireland. *T. gracilis* is quite widespead with most records from the western half of Europe extending from Iceland and Fennoscandia to Iberia and Italy. There are few records from eastern or south-eastern Europe including Northwest and Central European Russia, Romania, Serbia and Montenegro. However, it can be expected to be widespread in Europe.

***THIENEMANNIELLIA* Kieffer, 1911**

Thienemanniella acuticornis (Kieffer, 1912) +*
Thienemanniella clavicornis (Kieffer, 1911) +
Thienemanniella flavescens (Edwards, 1929) +
Thienemanniella majuscula (Edwards, 1924) +
Thienemanniella obscura Brundin, 1947 *
Thienemanniella vittata (Edwards, 1924) +*

Thienemanniella larvae are most commonly encountered in flowing waters varying from rapid, fast flowing rivers to lowland slow-flowing waters in ditches. Eleven species are known in the western Palaearctic, six of which are known from Ireland.

Thienemanniella acuticornis* (Kieffer, 1912) +

Known Irish and European - distributions Figures 571 and 572.

Status in Ireland: records from six locations in four HAs (22, 23, 32, 35) in Counties Fermanagh, Kerry and Mayo.

Comments: there are few records of *Thienemanniella acuticornis* in Ireland in the south-west, west and north-west in Northern Ireland. The first Irish record was given by Edwards (1929). It is known from most western European countries (except Iceland, Norway, Denmark, Belgium, Luxembourg, Switzerland and Portugal) but with major gaps in the south-east in most of the Balkans and in eastern Europe while it is doubtfully present in the Ukraine. The species is likely to occur in almost all major European countries and regions.

***Thienemanniella clavicornis* (Kieffer, 1911) +**

Known Irish and European distributions - Figures 573 and 574.

Status in Ireland: records from six locations in four HAs (7, 9, 22, 32) in Counties Dublin, Kerry, Mayo and Meath.

Comments: there are no records of *Thienemanniella clavicornis* from Northern Ireland. It is known from most major countries in western Europe except Denmark, the Netherlands, Luxembourg and Switzerland but is doubtfully present in Iceland. Gaps in its distribution include parts of the Balkans and eastern Europe and most Mediterranean islands. It is likely to prove to be a widespread European species occurring in most large countries and regions.

***Thienemanniella flavescens* (Edwards, 1929) +**

Known Irish and European distributions - Figures 575 and 576.

Status in Ireland: records from five locations in HA 22 in County Kerry.

Comments: *Thienemanniella flavescens* was first reported from south-west Ireland by Edwards (1929) and subsequently in the same area by Dowling *et al.* (1981). There are no records from Northern Ireland. There are only a few disjunct records in Europe and it is currently known from Ireland, Great Britain, France, the Balearic Islands and North European Russia. Its occurrence on the Balearic Islands indicates that it can be expected in Iberia and elsewhere in southern Europe and also likely to be found at

least in most major countries extending from the British Isles and France eastwards to North European Russia.

***Thienemanniella majuscula* (Edwards, 1924) +**

Known Irish and European distributions - Figures 577 and 578.

Status in Ireland: records from five locations, three on Clare Island and two in two HAs (32, 38) in Counties Donegal and Mayo. The species is not known from Northern Ireland.

Comments: *Thienemanniella majuscula* is likely to have a very widespread distribution in Europe but there are some major gaps including all Mediterranean islands, most of the Balkans and, eastern and parts of north-eastern Europe.

***Thienemanniella obscura* Brundin, 1947 ***

Known Irish and European distributions - Figures 579 and 580.

Status in Ireland: one record from HA 3 in County Derry.

Comments: the species was documented from Northern Ireland by Langton (2004) and there are no records from the Republic of Ireland. It is known from most western European countries (exceptions include Iceland, Norway, Denmark, Belgium, Switzerland and Portugal) and is doubtfully present in the Netherlands and Luxembourg. It is not on record from the Balkans or most of eastern Europe (except Slovakia and East European Russia). It can be expected to occur in all major countries and regions extending into eastern and north-eastern Europe. Its presence in Corsica suggests that it may occur elsewhere in southern Europe and the Mediterranean Basin.

Thienemanniella vittata* (Edwards, 1924) +

Known Irish and European distributions - Figures 581 and 582.

Status in Ireland: records from 77 locations in 22 HAs (1, 3, 6, 9, 10, 12, 15, 18, 20, 21, 22, 25, 26, 28, 30, 31, 32, 34, 35, 36, 38, 39) in Counties Carlow, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Limerick, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Waterford, Wexford and Wicklow.

Comments: *Thienemanniella vittata* has a widespread distribution in Ireland. It is known from most of the larger countries in western Europe except Iceland, Denmark, the Netherlands, Belgium, Luxembourg and Switzerland. Gaps in its distribution include parts of the Balkans and most of Eastern Europe. Its occurrence in Portugal, Corsica, Macedonia and European Turkey indicates that it is likely to be widespread in southern Europe and the Mediterranean Basin. The species can also be expected to occur in all major countries and regions of eastern and north-eastern Europe.

TRISSOCLADIUS Kieffer, 1908

Trissocladius brevipalpis Kieffer, 1908 +

Two species of *Trissocladius* are known from the western Palaearctic, one of which is known from Ireland. Larvae of both species live in small accumulations of water

such as puddles in constructed tubes of fine sand particles and vegetation (Sæther, 1976).

***Trissocladius brevipalpis* Kieffer, 1908 +**

Known Irish and European distributions - Figures 583 and 584.

Status in Ireland: record from one location in HA 38 in County Donegal.

Comments: the single record of *Trissocladius brevipalpis* in Ireland is in the north-west of the country. Although it is not on record from Northern Ireland it is very likely to occur there since the existing record is from the adjacent County Donegal. The European distribution of *T. brevipalpis* is irregular with large gaps in records of occurrence very likely due to a lack of sampling from the larval habitat of small ephemeral water bodies, such as puddles. It is currently also known from Great Britain, Belgium, the Netherlands, Denmark, Germany, Poland, Lithuania, Sweden, Finland, Central and Northwest European Russia, Hungary, Romania, Serbia, Montenegro and Spain but doubtfully present in the Ukraine. It is not known from Norway, France, Italy, Portugal, most of the Balkan countries and eastern Europe.

***TVETENIA* Kieffer, 1922**

Tvetenia bavarica (Goetghebuer, 1934) +*

Tvetenia calvescens (Edwards, 1929) +*

Tvetenia discoloripes (Goetghebuer & Thienemann, 1936) +*

Tvetenia verralli (Edwards, 1929) +*

Tvetenia larvae are found in flowing waters of rivers and streams. Seven species are known from western Europe, four of which are recorded in Ireland.

Tvetenia bavarica* (Goetghebuer, 1934) +

Known Irish and European distributions - Figures 585 and 586.

Status in Ireland: records from 34 locations in 16 HAs (1, 2, 3, 4, 5, 9, 10, 12, 20, 21, 22, 26, 33, 34, 35, 38) in Counties Antrim, Cork, Derry, Donegal, Down, Dublin, Kerry, Leitrim, Mayo, Roscommon, Sligo and Wicklow.

Comments: the records of *Tvetenia bavarica* are from scattered locations in Ireland but none in the southeast. It is not recorded from Iceland but is a widespread species in Europe with gaps in its distibution including Belgium, the Netherlands, parts of the Balkan and eastern Europe. It is likely to occur in most major European countries or region from which it has not yet been recorded.

Tvetenia calvescens* (Edwards, 1929) +

Known Irish and European distributions - Figures 587 and 588.

Status in Ireland: records from 268 locations in 33 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 18, 19, 20, 21, 22, 25, 26, 28, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Armagh, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick,

Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath and Wicklow.

Comments: *Tvetenia calvescens* in the most common species of the genus encountered in Irish rivers and streams. Pupal exuviae have occasionally been collected in the littoral zone of lakes that could have been passively carried with inflowing feeder streams or rivers. In Europe, it is quite widespread with a distribution pattern similar to *T. bavarica* as there are no records to date from Iceland and parts of the Balkans and eastern Europe.

Tvetenia discoloripes* (Goetghebuer & Thienemann, 1936) +

Known Irish and European distributions - Figures 589 and 590.

Status in Ireland: records from 65 locations in 20 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 16, 20, 22, 26, 30, 32, 35, 36) in Counties Antrim, Armagh, Cavan, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Longford, Mayo, Meath, Offaly, Tipperary, Wexford and Wicklow.

Comments: *Tvetenia discoloripes* is frequently found and is widely distributed in Irish rivers and streams. It is common in many western European countries but unknown from Iceland, Belgium, Norway, Portugal and Switzerland but other gaps include most Mediterranean islands and parts of the Balkans and eastern Europe.

Tvetenia verralli* (Edwards, 1929) +

Known Irish and European distributions - Figures 591 and 592.

Status in Ireland: records from 121 locations in 29 HAs (1, 2, 3, 4, 6, 7, 10, 11, 12, 15, 16, 18, 19, 20, 21, 22, 25, 26, 28, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Kilkenny, Leitrim, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Wexford and Wicklow.

Comments: *Tvetenia verralli* is frequently encountered and is a widely distributed species in rivers and streams in Ireland, often occurring with *T. calvescens*. It is common in all major western European countries (except Iceland) but there are major gaps in its distribution, being unknown from the Balkans and most of eastern Europe. It can be expected to occur in most major European countries or regions where records do not currently exist.

ZALUTSCHIA Lipina, 1939

Zalutschia humphriesiae Dowling & Murray, 1980 +

Zalutschia larvae occupy habitats in nutrient poor lakes but also in ponds, ditches and occasionally streams. Nine species are known from western Europe, one of which, *Z. humphriesiae*, was described from Ireland from specimens collected in 1974 in a bog pool in the Dublin Mountains (Dowling and Murray, 1980).

***Zalutschia humphriesiae* Dowling & Murray, 1980 +**

Known Irish and European distributions - Figures 593 and 594.

Status in Ireland: records from eight locations in eight HAs (9, 22, 27, 30, 31, 33, 34, 35) in Counties Clare, Dublin, Galway, Kerry, Leitrim and Mayo.
Comments: *Zalutschia humphriesiae* was described from Ireland (illustrations of male hypopygium and pupal exuviae on front and back covers respectively) and was named after Professor Carmel Humphries, Ph.D mentor of the senior author. Larvae of *Zalutschia humphriesiae* are found in bog pools and small oligotrophic lakes. The species has not yet been recorded in Northern Ireland. There are also records in Europe from Great Britain, Norway, the Netherlands and the Iberian Peninsula and a likely record from Finland (Paasivirta, 2012). It may be a common and widespread species in the northern half of Europe but in more southern latitudes will likely be mostly restricted to bog pool and oligotrophic lake habitats at higher altitudes.

Subfamily CHIRONOMINAE Newman, 1834
Tribe Chironomini Newman, 1834
BAEOTENDIPES Kieffer, 1913

Baeotendipes noctivagus (Kieffer, 1911) +

Baeotendipes belongs to the *Chironomus* Meigen group of taxa. Epler *et al*. (2013) have questioned the placement as a separate genus despite the characteristic hypopygium of the male imago - subgeneric status may be more appropriate.

Baeotendipes noctivagus (Kieffer, 1911) +

Known Irish and European distribution - Figures 595 and 596.
Status in Ireland: record from one location in HA 20, County Cork.
Comments: larvae of *Baeotendipes noctivagus* are halophilous, grazing on detritus in soft sediments of saline ponds. The recent record of *B. noctivagus* in Ireland is from a saline pond in the Wildlife Park at Fota Island in the Cork Estuary (Murray, 2016b, c). Water level in the pond is prone to fluctuation with rising and falling tide in the Cork estuary. The species has a predominantly *circum* Mediterranean distribution with known records from Spain, Italy, Greece, the Balearic Islands and Sardinia. It is also known from Black Sea coastal impoundments in Bulgaria, Romania, the Ukraine and from the Atlantic Canary Islands. The record from Ireland has extended the known distribution range considerably northwards. Additional records may be expected from the coastlines of most countries bordering the Black Sea and the Mediterranean Sea in which it is currently not documented. Its recent discovery in Ireland indicates that its occurrence on Atlantic coasts from Portugal to Great Britain and the Netherlands would not be surprising.

BENTHALIA Lipina, 1939

Benthalia carbonaria (Meigen, 1804) +*

Two species of *Benthalia* are known from the western Palaearctic Region, one of which is on record from Ireland.

Benthalia carbonaria* (Meigen, 1804) +

[= *Lobochironomus dissidens* (Walker); = *Einfeldia dissidens* (Walker)]

Known Irish and European distribution - Figures 597 and 598.

Status in Ireland: records from eight locations in five HAs (7, 30, $33, 34, 36) in Counties Cavan, Fermanagh, Galway, Mayo and Monaghan. [$Murray and Ashe, 2017].

Comments: the species was first recorded in Ireland in 1980 as *Einfeldia dissidens* from Lough Corrib, County Galway (Murray *et al.*, 2015). The first published record for Ireland was as *Chironomus* (*Lobobochironomus dissidens*) by Langton (2002) from Lough Belcoo, County Fermanagh, Northern Ireland. The species is widely distributed in the western Palaearctic but is not on record from Iceland, Norway, Latvia, Belarus, the Czech Republic, Moldova and South European Russia but noticeable gaps in its currently known distribution are from most of the Balkans, the Iberian Peninsula and all islands of the Mediterranean Sea. Its occurrence in European Turkey, Montenegro and Serbia indicates that it is likely to be widespread in southern Europe.

CHIRONOMUS Meigen, 1803

Chironomus (*Chironomus*) *alpestris* Goetghebuer, 1934 +*

= *dorsalis* auct. sensu Strenzke, 1959

Chironomus (*Chironomus*) *annularius* Meigen, 1818 +*

Chironomus (*Chironomus*) *anthracinus* Zetterstedt, 1860 +*

Chironomus (*Chironomus*) *aprilinus* Meigen, 1818 +*

Chironomus (*Chironomus*) *bernensis* Klötzli, 1993 +*

Chironomus (*Chironomus*) *cingulatus* Meigen, 1830 +*

Chironomus (*Chironomus*) *commutatus* Keyl, 1960 +*

Chironomus (*Chironomus*) *lacunarius* Wülker, 1973 +

Chironomus (*Chironomus*) *longistylus* Goetghebuer, 1921 +*

Chironomus (*Chironomus*) *lugubris* Zetterstedt, 1850 +*

Chironomus (*Chironomus*) *luridus* Strenzke, 1959 +*

Chironomus (*Chironomus*) *nuditarsis* Keyl, 1961 +*

Chironomus (*Chironomus*) *nudiventris* Ryser, Scholl & Wülker, 1983 +*

Chironomus (*Chironomus*) *obtusidens* Goetghebuer, 1921 +*

Chironomus (*Chironomus*) *pallidivittatus* Edwards, 1929 +*

Chironomus (*Chironomus*) *piger* Strenzke, 1956 +*

Chironomus (*Chironomus*) *pilicornis* (Fabricius, 1787) +*

Chironomus (*Chironomus*) *plumosus* (Linnaeus, 1758) +*

Chironomus (*Chironomus*) *prasinus* Meigen sensu Pinder, 1978 +?

Chironomus (*Chironomus*) *pseudothummi* Strenzke, 1959 +*

Chironomus (*Chironomus*) *riparius* Meigen, 1804 +*

Chironomus (*Chironomus*) *salinarius* Kieffer, 1915 +?

Chironomus (*Chironomus*) *tentans* Fabricius, 1805 +*

Chironomus (*Chironomus*) "sp. A" sensu Pinder, 1978 +
Chironomus (*Lobochironomus*) *dorsalis* Meigen, 1818 +

It has recently been noted that the record of *Chironomus* (*Chironomus*) *striatus* Strenzke, 1959 in Ireland is a misidentification of *Chironomus* (*Chironomus*) sp A and **it is here removed from the Irish list**.

The genus *Chironomus* is estimated to have several hundred species worldwide (Epler *et al*., 2013). Eighty five species are known from the western Palaearctic of which 24 are currently on record from Ireland. Larvae mostly graze on detritus and some are filter feeders living predominantly in standing waters although some are known from suitable silty habitats in slow-flowing rivers. A few are halophilous and have successfully adapted to low salinity waters while some are found in humic conditions and are tolerant of low pH values. Larvae of many species are generally tolerant of low oxygen conditions or organically enriched habitats.

Subgenus ***CHIRONOMUS*** Meigen, 1803

Chironomus* (*Chironomus*) *alpestris* Goetghebuer, 1934 +

[= *dorsalis* auct. sensu Strenzke, 1959]

Known Irish and European distribution - Figures 599 and 600.

Status in Ireland: records from seven locations, one on Clare Island and six in five HAs (6, 7, 8, 32, 33) in Counties Armagh, $Dublin, Galway, Mayo and Meath. [$The record from County Dublin is previously unpublished and it comes from a collection by the second author (JPOC) at Knock Pond (Wavin Lake), Balrothery (IGR O 192609) on 12 October 2017].

Comments: two records, one from Clare Island and one from a site in HA32 are uncertain as they are based on historic records as "*Tendipes* (*Chironomus*) *dorsalis* Mg." by Grimshaw (1912). *Chironomus* (*C.*) *alpestris* is a widespread European species but not recorded from Iceland, the Baltic Republics, Belarus, much of the Balkans and most islands of the Mediterranean Sea (except the Balearics and Corsica) with uncertain records from the Ukraine and European Turkey. Continued sampling might be expected to yield additional country records.

Chironomus* (*Chironomus*) *annularius* Meigen, 1818 +

Known Irish and European distribution - Figures 601 and 602.

Status in Ireland: records from eight locations in five HAs (3, 9, 19, 22, 30) in Counties Antrim, Cork, Derry, Dublin and Kerry.

Comments: it is widespread but undocumented in a few countries and regions of northern and eastern Europe. Major distribution gaps in the south include Portugal, most of the Balkans and most islands of the Mediterranean Sea (except the Balearics and Corsica). The species is likely to be found in most European countries.

Chironomus* (*Chironomus*) *anthracinus* Zetterstedt, 1860 +

Known Irish and European distribution - Figures 603 and 604.

Status in Ireland: records from 53 locations in 22 HAs (1, 3, 4, 5, 7, 10, 16, 18, 19, 20, 21, 22, 25, 26, 27, 28, 30, 32, 35, 36, 37, 38) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Mayo, Tipperary, Waterford, Westmeath, Wicklow.

Comments: this species is quite widespread in the northern half of Europe (except Iceland, the Netherlands, Estonia, Latvia, Belarus, South European Russia and Slovakia) and is doubtfully present in the Ukraine. Major gaps in distribution are in the south of Europe including Iberia, all of the Balkans and most Mediterranean islands (except Corsica). However, its occurrence in European Turkey and Corsica indicates that the species is likely to be widespread in southern Europe.

Chironomus (*Chironomus*) *aprilinus* Meigen, 1818 +*

Known Irish and European distribution - Figures 605 and 606.

Status in Ireland: records from 16 locations, two on Clare Island, four on Rathlin Island and ten in six HAs (3, 6, 13, 32, 36, 39) in Counties Antrim (Rathlin Island only), Armagh, Donegal, Louth, Mayo, Monaghan and Wexford.

Comments: *Chironomus* (*Chironomus*) *aprilinus* is known from most of north-western Europe (including Iceland) and some countries of the east but major gaps include easternmost Europe (all of Russia, the Baltic Republics, Kaliningrad, Belarus) and much of southern Europe (Portugal, Italy, most of the Balkans and all Mediterranean islands (except Corsica)). The species is likely to be found in most European countries.

Chironomus (*Chironomus*) *bernensis* Klötzli, 1993 +*

Known Irish and European distribution - Figures 607 and 608.

Status in Ireland: records from 10 locations in five HAs (2, 3, 4, 27, 39) in Counties Antrim, Clare, Derry, Donegal and Tyrone.

Comments: most records of *Chironomus* (*Chironomus*) *bernensis* are from western and middle Europe as well as Spain, Corsica and Italy in the south. However, it has not been found in northern, eastern or south-eastern Europe. Its presence in Corsica, the Near East and North Africa indicates that it can be expected elsewhere in the countries of the Mediterranean Basin. It may be a predominantly middle and southern European species.

Chironomus (*Chironomus*) *cingulatus* Meigen, 1830 +*

Known Irish and European distribution - Figures 609 and 610.

Status in Ireland: records from 11 locations, one on Clare Island and six in seven HAs (3, 7, [$]21, 22, 25, 31, 40) in Counties Armagh, [$]Cork, Derry, Donegal, Galway, Kerry, Offaly, Mayo (Clare Island only) and Meath. [[$]Murray and Ashe, 2017].

Comments: this species is quite widely distributed but is undocumented from Iceland, Iberia, most Mediterranean islands (except Sicily), most of the Balkans and some eastern European countries. The species is likely to be found in most European countries.

Chironomus (*Chironomus*) *commutatus* Keyl, 1960 +*

Known Irish and European distribution - Figures 611 and 612.

Status in Ireland: records from 11 locations in seven HAs (3, 7, $21, 22, 25, 31, 40) and Clare Island (County Mayo) in Counties Armagh, $Cork, Derry, Donegal, Galway, Kerry, Offaly, Mayo (Clare Island only) and Meath. [$Murray and Ashe, 2017].
Comments: this is a species with a distribution restricted to the British Isles, Sweden, Estonia, a cluster of countries in the western half of continental Europe and central and South European Russia. It can be expected to occur widely in northern and middle Europe but there are insufficient data available to indicate whether or not it will have a broad distribution in southern Europe.

Chironomus (*Chironomus*) *lacunarius* Wülker, 1973 +

Known Irish and European distribution - Figures 613 and 614.
Status in Ireland: a single record from one location in HA 36, County Westmeath.
Comments: *Chironomus* (*Chironomus*) *lacunarius* has a sporadic distribution with records from the British Isles, Norway, a cluster of countries in the western half of continental Europe and two regions of Russia (North and South European Russia). It is likely to be widespread at least in northern and middle Europe.

Chironomus (*Chironomus*) *longistylus* Goetghebuer, 1921 +*

Known Irish and European distribution - Figures 615 and 616.
Status in Ireland: records from 13 locations, one on Rathlin Island and 12 in nine HAs (1, 2, 3, $5, 7, 9, 30, 32, 36) in Counties Antrim (Rathlin Island only) Armagh, Derry, $Down, Fermanagh, Galway, Meath and Monaghan. [$This previously unpublished and first record of the species from HA5 and County Down comes from collections on 19 June 2017 by the second author (JPOC) at Lough Tullynagee, near Lisbane (IGR J470630)].
Comments: this species has an irregular distribution and is mostly known from western and northern Europe, a few areas of eastern Europe (including Central European Russia) and the Balearic Islands in the Mediterranean Sea. It is likely to occur in most European countries and regions.

Chironomus (*Chironomus*) *lugubris* Zetterstedt, 1850 +*

Known Irish and European distribution - Figures 617 and 618.
Status in Ireland: records from four locations in four HAs (3, 7, 9, 32) in Counties Antrim, Galway, Meath and Wicklow.
Comments: *Chironomus* (*Chironomus*) *lugubris* has a patchy distribution and is found in northern (Svalbard, Norway, Sweden, Finland but doubtfully present in Iceland), western (British Isles) and middle Europe (the Netherlands, Germany, Switzerland, Hungary and the Ukraine). The species can be expected elsewhere in the northern half of Europe. If it is associated with cooler waters any occurrences in southern Europe may be mostly restricted to habitats at higher altitude.

Chironomus (*Chironomus*) *luridus* Strenzke, 1959 +*

Known Irish and European distribution - Figures 619 and 620.

Status in Ireland: records from 28 locations, one on Rathlin Island and 27 in ten HAs (1, 3, 7, 8, 9, 12, 18, 25, 36, 39) in Counties Armagh, Cavan, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Meath, Monaghan and Wexford.
Comments: *Chironomus* (*Chironomus*) *luridus* is quite widespread but gaps in distribution include Portugal, Iceland, Sweden, Denmark, the Baltic Republics, Belarus, Moldova, East and South European Russia, almost all of the Balkans and most Mediterranean islands (except the Balearics and Corsica). Records may be expected from many of those countries and regions.

Chironomus* (*Chironomus*) *nuditarsis* Keyl, 1961 +

Known Irish and European distribution - Figures 621 and 622.
Status in Ireland: records from 21 locations in ten HAs (1, 3, 7, $9, 25, 26, 27, 29, 36, 39) in Counties Antrim, Armagh, Cavan, Clare, Derry, Donegal, $Dublin, Galway, Leitrim, Meath, Monaghan and Tyrone. [$Murray and Ashe, 2017].
Comments: *Chironomus* (*Chironomus*) *nuditarsis* is known from the British Isles and mostly in the western half of continental Europe with isolated records elsewhere including Norway, Northwest European Russia and Bulgaria. The species is likely to occur in most European countries and regions.

Chironomus* (*Chironomus*) *nudiventris* Ryser, Scholl & Wülker, 1983 +

Known Irish and European distribution - Figures 623 and 624.
Status in Ireland: records from 14 locations in four HAs (3, 36, 38, 39) in Counties Antrim, Derry, Donegal, Fermanagh, and Tyrone.
Comments: existing records of *Chironomus* (*Chironomus*) *nudiventris* in Ireland are confined to northern and north-west regions of the country. In Europe, it has a patchy distribution that includes the British Isles, Spain, a cluster of countries extending from the Netherlands and Germany south to Italy and several countries and regions of easternmost Europe (Hungary, the Ukraine, Belarus, Estonia and parts of Russia) but is doubtfully present in Finland. Records may be expected from most of these European countries and regions where they are currently lacking.

Chironomus* (*Chironomus*) *obtusidens* Goetghebuer, 1921 +

Known Irish and European distribution - Figures 625 and 626.
Status in Ireland: records from seven locations in seven HAs (4, 5, 10, 22, 26, 30, 39) in Counties Antrim, Cavan, Donegal, Galway, Kerry and Wicklow.
Comments: this species is quite widespread in the northern half of Europe but is not recorded from Iceland, Finland, Latvia, Lithuania, Kaliningrad and Belarus or in southern regions including Iberia, Mediterranean islands and in south-east Europe (except Bulgaria). Its presence in Bulgaria indicates that the species can be expected elsewhere in southern Europe.

Chironomus* (*Chironomus*) *pallidivittatus* Edwards, 1929 +

Known Irish and European distribution - Figures 627 and 628.

Status in Ireland: records from 14 locations, four on Rathlin Island and ten in eight HAs (1, 3, $9, 12, 27, 29, 36, 39) in Counties Antrim , Clare, Derry, Donegal, $Dublin, Galway, Wexford and Westmeath. [$Murray and Ashe, 2017].

Comments: most records of this species are from the western half of Europe as well as some countries and regions in the east and Norway and Finland in the north. However, records are currently uncertain from Sweden and the Ukraine. There no records from much of north-eastern Europe, all of the Balkans and all Mediterranean islands.

Chironomus* (*Chironomus*) *piger* Strenzke, 1956 +

Known Irish and European distribution - Figures 629 and 630.

Status in Ireland: records from 27 locations in 13 HAs (1, 2, 3, 8, $9, 13, 27, 30, 32, 33, 36, 39, 40) in Counties Antrim Clare, Derry, Donegal, Down, $Dublin, Fermanagh, Galway, Mayo, Meath, Tyrone and Wexford. [$Murray and Ashe, 2017].

Comments: mostly widely distributed in Europe but there are no records of *Chironomus* (*Chironomus*) *piger* from Iceland, Portugal, Mediterranean islands (except Corsica) and a broad track of countries extending from Sweden southwards through Poland to Italy and the Balkans (except for Kaliningrad and Bulgaria) and it is doubtfully present in Greece. The species is likely to occur in most European countries.

Chironomus* (*Chironomus*) *pilicornis* (Fabricius, 1787) +

Known Irish and European distribution - Figures 631 and 632.

Status in Ireland: records from four locations in three HAs (3, 7, 25) in Counties Antrim, Cavan, Derry, Meath and Westmeath.

Comments: distribution records of this species are currently restricted to 15 European countries or regions from Germany northwards, including the British Isles and Scandinavia, but it is doubtfully present in the Ukraine. The species can be expected elsewhere in northern Europe and if it occurs in the south, it may be mostly limited to habitats at higher altitudes.

Chironomus* (*Chironomus*) *plumosus* (Linnaeus, 1758) +

Known Irish and European distribution - Figures 633 and 634.

Status in Ireland: records from 68 locations, three on Rathlin Island and 65 in 19 HAs (1, 3, 5, 6, 7, 9, 10, 17, 21, 22, 25, 26, 27, 29, 30, 32, 33, 36, 39) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Kildare, Leitrim, Mayo, Monaghan, Offaly, Tyrone Waterford, Westmeath and Wicklow.

Comments: *Chironomus* (*Chironomus*) *plumosus* is the most widely distributed European species of the genus *Chironomus*. It has not been recorded from Iceland, Svalbard, Luxembourg, Slovenia, Croatia, Moldova, Mediterranean islands (except Corsica) and several small countries of limited land area. Although the species is known from Spain, its presence in Portugal is uncertain.

***Chironomus* (*Chironomus*) *prasinus* Meigen sensu Pinder, 1978 +?**

Known Irish and European distribution - Figures 635 and 636.

Status in Ireland: records from four locations in three HAs (25, 29, 30) in Counties Clare and Galway. There are no records from Northern Ireland.
Comments: the first record of the taxon in Ireland by Murray (1972) from Lough Corrib (HA30, County Galway) was based on adult material determined from Coe (1950). The other known Irish records are from pupal exuviae in the personal collections of P. H. Langton (Murray *et al*., 2015). The taxon is cited as doubtfully present in Northern Ireland by Spies and Sæther (2013) but there are no confirmed records. In England, it was regarded by Edwards (1929) as a variety of *C. plumosus* and was recognised by Coe (1950) as "var *prasinatus* Meigen". In the key to adult males of British Chironomidae, Pinder (1978) included the taxon as a distinct species "*C. prasinus* Meigen sensu Edwards" with a comment "although Edwards regarded *prasinus* as a variety of *C. plumosus* the hypopygia of the two species are distinct". It was retained as "*Chironomus* (*C.*) *prasinus* Meigen" in the more recent keys to adult male Chironomidae by Langton and Pinder (2007).

Spies and Sæther (2004) give a detailed account of the unresolved taxonomic status of this morphotype within the *C. plumosus* species complex and the rationale for use of the artificial name "*C. prasinus* Pinder 1978" in the Fauna Europaea database that gives distribution records from much of central and western Europe, all cited as "doubtfully present" due to the uncertainty of its taxonomic status.

Chironomus* (*Chironomus*) *pseudothummi* Strenzke, 1959 +

Known Irish and European distribution - Figures 637 and 638.
Status in Ireland: records from 14 locations, five on Clare Island, one on Rathlin Island and eight in seven HAs (7, 9, 21, 27, 32, 33, 36) in Counties Antrim (Rathlin Island only), Clare, Cork, Dublin, Galway, Mayo, Meath and Westmeath.
Comments: this species is known primarily from north-western, central and northern Europe but is also on record from Moldova and Bulgaria in the south-east. It is likely to be quite widespread, including southern Europe, as the records from Moldova and Bulgaria indicate.

Chironomus* (*Chironomus*) *riparius* Meigen, 1804 +

Known Irish and European distribution - Figures 639 and 640.
Status in Ireland: records from 19 locations, one each on Clare Island and Rathlin Island and 17 in nine HAs (3, 4, 7, $^{\$}$9, 16, 22, 26, 32, 36, 39) in Counties Antrim, Cavan, Derry, Donegal, Down, $^{\$}$Dublin, Kerry, Mayo, Meath, Roscommon and Tipperary. [$^{\$}$Murray and Ashe, 2017].
Comments: this is a very widespread species though records are currently lacking from Iceland, Svalbard, Kaliningrad, East European Russia, parts of the Balkans and most Mediterranean islands (except the Balearics and Corsica). However, records may be expected from most major European countries and regions.

***Chironomus* (*Chironomus*) *salinarius* Kieffer, 1915 +?**

Known Irish and European distribution - Figures 641 and 642.

Status in Ireland: records from eight locations in coastal regions of six HAs (12, $20, 21, 31, $33, 39) in Counties Cork, Donegal, Galway, $Mayo and Wexford. [$Record from HA20 by Murray (2016b), from HA33 and County Mayo by Murray (2017b)].
Comments: *Chironomus* (*Chironomus*) *salinarius* is a halobiontic species whose larvae inhabit brackish waters in soft sediments (Neumann, 1976). Murray *et al*. (2016) indicated that the record by Langton (2002) of *C. salinarius* from Lough Swilly, County Donegal, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Thus, while it is likely to occur, there are no records of the species to date in Northern Ireland. The species is quite widely distributed in coastal European countries (including Iceland), but is undocumented in Portugal, several countries and regions in central and easternmost Europe, all of the Balkans (except Bulgaria) and some Mediterranean islands.

Chironomus* (*Chironomus*) *tentans* Fabricius, 1805 +

Known Irish and European distribution - Figures 643 and 644.
Status in Ireland: records from 53 locations, two on Clare Island, one on Rathlin Island, one on Tory Island and 49 in 16 HAs (3, $5, 7, 13, 17, 20, 24, 25, 26, 27, 29, 30, 32, 34, 36, 38) in Counties Antrim (Rathlin Island only), Cavan, Clare, Cork, Derry, Donegal (including Tory Island), Down, Fermanagh, Galway, Limerick, Mayo (including Clare Island), Monaghan, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath and Wexford. [$This previously unpublished and first record of the species from HA5 and County Down comes from collections on 19 June 2017 by the second author (JPOC) at Lough Tullynagee, near Lisbane (IGR J470630)].
Comments: this is a widely distributed species in Europe but there are no records from Iceland, Svalbard, Latvia, Belarus, Luxembourg, Slovakia, Moldova, Portugal, most of the Balkans and all Mediterranean islands (except the Balearics). It can be expected from most European countries where records are currently lacking.

***Chironomus* (*Chironomus*) "sp. A" sensu Pinder, 1978 +**

Distribution - Figures are not given for this taxon.
Status in Ireland: known from four locations in four HAs (25, 26, 29, 30) in Counties Cavan, Galway and Westmeath.
Comments: this morphotype was recognised by Pinder (1978) from two specimens in the British Museum (Natural History) that had previously been identified as *Chironomus striatus* Strenzke in Kloet and Hincks (1975). It is thus far only known from England and Ireland. Adult males are distinguished by having a distally broadly rounded anal point and a broad inferior volsella - in contrast to the closely related *C.* (*C.*) *obtusidens* that has a broad anal point tapering distally and a narrow inferior volsella. The record of *C.* (*C.*) *striatus* in Murray *et al.* (2015), and previous listings, was a misidentification of *Chironomus* (*C.*) sp. A. There is no confirmed record of *C.* (*C.*) *striatus* in Ireland and it is removed from the Irish list.

Subgenus *LOBOCHIRONOMUS* Ryser, Wülker & Scholl, 1985

Chironomus (*Lobochironomus*) *dorsalis* Meigen, 1818 +

= *longipes* Staeger, 1839

Six species within *Lobochironomus* are recognised in Europe, one of which is documented from the Republic of Ireland only.

Chironomus (*Lobochironomus*) *dorsalis* Meigen, 1818 +

Known Irish and European distribution - Figures 645 and 646.

Status in Ireland: records from 2 locations in HA 30, County Galway.

Comments: this species has a wide regional distribution but with gaps in records in Europe similar to those of *Chironomus tentans* (i.e. Iceland, Svalbard, Estonia, Latvia, Belarus, East and South European Russia, Luxembourg, Czech Republic, Moldova, Portugal, most of the Balkans and all Mediterranean islands). It may be expected to occur in most European countries and regions currently lacking records.

CLADOPELMA Kieffer, 1921

Cladopelma bicarinatum (Brundin, 1947) +

Cladopelma goetghebueri Spies & Sæther, 2004 +

= *laterale* Goetghebuer, 1934

Cladopelma krusemani (Goetghebuer, 1935) +*

Cladopelma virescens (Meigen, 1818) +

Cladopelma viridulum (Linnaeus, 1767) +*

Cladoplema larvae are eurytopic (Epler *et al*., 2013) and live in a large variety of habitats in streams, rivers, lakes and ponds as well as in brackish waters. Seven species are known from the western Palaearctic, five of which are recorded in Ireland.

Cladopelma bicarinatum (Brundin, 1947) +

Known Irish and European distribution - Figures 647 and 648.

Status in Ireland: records from five locations in four HAs (21, 22, 32, 35) in Counties Galway, Kerry and Leitrim. There are no records from Northern Ireland to date.

Comments: *Cladopelma bicarinatum* appears to be infrequently recorded in Europe with documented records only from Ireland, Great Britain, the Netherlands, Austria, Germany and the Scandinavian countries of Finland, Norway and Sweden.

Cladopelma goetghebueri Spies & Sæther, 2004 +

[= *laterale* Goetghebuer, 1934]

Known Irish and European distribution - Figures 649 and 650.

Status in Ireland: records from five locations in 12 HAs (7, 19, 21, 22, 26, 27, 30, 32, 32, 35, 36, 38) in Counties Cavan, Clare, Cork, Donegal, Galway, Kerry and Leitrim. There are no records from Northern Ireland to date.

Cladopelma krusemani (Goetghebuer, 1935) +*

Known Irish and European distribution - Figures 651 and 652.

Status in Ireland: records from five locations, two each on Clare Island and Rathlin Island and one in HA 38 in Counties Antrim (Rathlin Island only), Donegal and Mayo (Clare Island only).
Comments: records of *Cladopelma krusemani* in Europe are rare and this species is thus far only known from Ireland, Great Britain, Belgium, France and Switzerland.

***Cladopelma virescens* (Meigen, 1818) +**

Known Irish and European distribution - Figures 653 and 654.
Status in Ireland: records from eight locations in five HAs (16, 26, 30, 36, 38) in Counties Cavan, Donegal, Galway, Kerry Leitrim, Mayo and Tipperary. There are no records from Northern Ireland to date.

Cladopelma viridulum* (Linnaeus, 1767) +

Known Irish and European distribution - Figures 655 and 656.
Status in Ireland: records from 83 locations, two on Rathlin Island and 81 in 25 HAs (1, 3, 6, 7, 10, 16, 17, 19, 21, 22, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim (Rathlin Island only), Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry Leitrim, Louth, Mayo, Monaghan, Offaly, Roscommon, Sligo, Waterford, Westmeath and Wicklow.

CRYPTOCHIRONOMUS Kieffer, 1918

Cryptochironomus albofasciatus (Staeger, 1839) +*
Cryptochironomus defectus (Kieffer, 1913) +*
Cryptochironomus denticulatus (Goetghebuer, 1921) +*
Cryptochironomus obreptans (Walker, 1856) +*
Cryptochironomus psittacinus (Meigen, 1830) +*
Cryptochironomus redekei (Kruseman, 1933) +
Cryptochironomus rostratus Kieffer, 1921 +*
Cryptochironomus supplicans (Meigen, 1830) +*
Cryptochironomus "Pe 1" sensu Langton, 1984 +

Larvae of *Cryptochironomus* occur in a variety of substrates in lakes and slow flowing rivers and occasionally in city ponds (Vallendunk and Morozova, 2005). Some are known as facultative predators of oligochaete worms. Ten species are on record from the western Palaearctic, eight of which are known from Ireland with one additional species recognized by its pupal morphotype.

Cryptochironomus albofasciatus* (Staeger, 1839) +

Known Irish and European distribution - Figures 657 and 658.
Status in Ireland: records from 17 locations in ten HAs (3, 7, 19, 21, 22, 30, 31, 32, 37, 38) in Counties Cavan, Cork, Derry, Donegal, Galway, Kerry and Mayo.

Cryptochironomus defectus* (Kieffer, 1913) +

Known Irish and European distribution - Figures 659 and 660.

Status in Ireland: records from nine locations, one on Rathlin Island and eight in seven HAs (3, 4, 18, 27, 30, 33, 36) in Counties Antrim, Clare, Derry, Fermanagh, Mayo and Waterford.

Cryptochironomus denticulatus* (Goetghebuer, 1921) +

Known Irish and European distribution - Figures 661 and 662.

Status in Ireland: records from seven locations in six HAs (2, 3, $12, 18, 25, 26) in Counties $Carlow, Clare, Derry, Roscommon and Waterford. [$Murray and Ashe, 2017].

Cryptochironomus obreptans* (Walker, 1856) +

Known Irish and European distribution - Figures 663 and 664.

Status in Ireland: records from 64 locations, one on Rathlin Island and 63 in 23 HAs (3, 4, 5, 7, 16, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo, Monaghan, Offaly, Roscommon, Sligo, Tyrone, Waterford and Westmeath.

Cryptochironomus psittacinus* (Meigen, 1830) +

Known Irish and European distribution - Figures 665 and 666.

Status in Ireland: records from 48 locations, one on Rathlin Island and 47 in 17 HAs (5, 9, 16, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 38) in Counties Antrim (Rathlin Island only), Cavan, Clare, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo, Monaghan, Offaly, Waterford and Westmeath.

***Cryptochironomus redekei* (Kruseman, 1933) +**

Known Irish and European distribution - Figures 667 and 668.

Status in Ireland: records from five locations in four HAs (26, 29, 30, 32) in Counties Galway and Leitrim. There are no records to date from Northern Ireland.

Cryptochironomus rostratus* Kieffer, 1921 +

Known Irish and European distribution - Figures 669 and 670.

Status in Ireland: records from 12 locations in six HAs (3, 7, 9, 12, 25, 38) in Counties Carlow, Derry, Donegal, Kildare, Meath, Offaly and Wexford.

Cryptochironomus supplicans* (Meigen, 1830) +

Known Irish and European distribution - Figures 671 and 672.

Status in Ireland: records from 82 locations, two on Rathlin Island and 80 in 20 HAs (3, 7, 17, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim. Limerick, Longford, Mayo, Monaghan, Roscommon, Sligo, Tipperary, Tyrone, Waterford and Westmeath.

***Cryptochironomus* "Pe 1" sensu Langton, 1984 +**

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: records from two locations in two HAs (26, 30) in Counties Galway and Roscommon. There are no records from Northern Ireland.

Comments: the pupal exuviae of this morphoptype were first recognised and described as "*Cryptochironomus* Pe 1" by Langton (1984) and later included in Langton (1991). Langton and Visser (2003) retained the morphotype as "*Cryptochironomus* pe 1". The characteristic exuviae, not yet linked with the adult, are recognised by having a posterior transverse row of points on sternites I-VII and by the fine reticulation on tergites I - V in contrast to the thick-walled reticulation in *Cryptochironomus psittacinus* that also has posterior rows of points on sternites I-VII. The earliest record in Ireland is from drift-net collections of pupal exuviae in the River Dalgan, County Roscommon, in August 1981 (Hayes, 1991).

CRYPTOTENDIPES Beck & Beck, 1969

Cryptotendipes pflugfelderi Reiss, 1964 +
Cryptotendipes pseudotener (Goetghebuer, 1922) +
Cryptotendipes usmaensis (Pagast, 1931) +

Cryptotendipes larvae live in sand and mud substrata in rivers and lakes, some are mildly tolerant of organic pollution. Six species are known from Europe, three of which are on record from Ireland in the Republic of Ireland only.

Cryptotendipes pflugfelderi Reiss, 1964 +

Known Irish and European distribution - Figures 673 and 674.
Status in Ireland: records from 14 locations in six HAs (25, 26, 27, 30, 35, 36) in Counties Cavan, Clare, Leitrim, Mayo, Offaly, Roscommon, Sligo and Westmeath. There are no records from Northern Ireland.
Comments: *Cryptotendipes pflugfelderi* is to date only known from six European countries that comprise Ireland, Great Britain, Germany, Austria, Italy and Finland.

Cryptotendipes pseudotener (Goetghebuer, 1922) +

Known Irish and European distribution - Figures 675 and 676.
Status in Ireland: records from two locations in two HAs (7, 19) in Counties Cavan and Cork.

Cryptotendipes usmaensis (Pagast, 1931) +

Known Irish and European distribution - Figures 677 and 678.
Status in Ireland: records from two locations in HA 27, County Clare.

DEMEIJEREA Kruseman, 1933

Demeijerea rufipes (Linnaeus, 1761) +*

Demeijerea larvae mine in sponges, bryozoans and plants such as *Sparganium* spp.

Demeijerea rufipes (Linnaeus, 1761) +*

Known Irish and European distribution - Figures 679 and 680.
Status in Ireland: records from 21 locations, one on Clare Island and 20 in 12 HAs (3, 16, 20, 22, 26, 27, 30, 32, 33, 34, 35, 39) in Counties Antrim, Clare, Cork, Donegal, Galway, Kerry, Leitrim, Longford, Mayo, Sligo and Waterford.

Comments: this species is widely distributed in western Europe but is not on record from the Iberian Peninsula, the Balkans and parts of eastern Europe.

***DEMICRYPTOCHIRONOMUS* Lenz, 1941**

Demicryptochironomus (*Demicryptochironomus*) *vulneratus* (Zetterstedt, 1838) +*
Demicryptochironomus (*D.*). "Pe 1" sensu Langton, 1991 +
Demicryptochironomus (*Irmakia*) *neglectus* Reiss, 1988 +

Larvae of the genus are characteristic of clean sandy areas of rivers and streams. Two subgenera are recognised in the genus, *Demicryptochironomus* Lenz, 1941 and *Irmakia* Reiss, 1988. Three species are known from Europe. Two species are known from Ireland, one in *Irmakia* and two in *Demicryptochironomus,* including pupal exuviae of a second, not yet linked described species.

Subgenus *DEMICRYPTOCHIRONOMUS* Lenz, 1941

Demicryptochironomus* (*Demicryptochironomus*) *vulneratus* (Zetterstedt, 1838) +

Known Irish and European distribution - Figures 681 and 682.

Status in Ireland: records from 112 locations in 29 HAs (2, 3, 4, 7, 9, 12, 15, 16, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Leitrim, Limerick, Longford, Mayo, Meath, Roscommon, Sligo Tipperary, Waterford, Westmeath and Wicklow.

***Demicryptochironomus* (*Demicryptochironomus*) "Pe 1" sensu Langton, 1991 +**

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: records from six locations in five HAs (10, 15, 36, 38, 39) in Counties Cavan, Donegal, Kilkenny and Wicklow.

Comments: exuviae of this pupal morphotype, as yet unassociated with a described species, were first collected in Ireland in 1982 and most recently in 2009 (Murray *et al.*, 2015).

Subgenus *IRMAKIA* Reiss, 1988

***Demicryptochironomus* (*Irmakia*) *neglectus* Reiss, 1988 +**

Known Irish and European distribution - Figures 683 and 684.

Status in Ireland: records from two locations in two HAs (10, 32) in Counties Mayo and Wicklow.

Comments: the known western Palaearctic distribution of this species is thus far restricted to Ireland, Great Britain, Finland, France, Germany, Switzerland and Austria.

***DICROTENDIPES* Kieffer, 1913**

Dicrotendipes lobiger (Kieffer, 1921) +*
Dicrotendipes nervosus (Staeger, 1839) +*
Dicrotendipes notatus (Meigen, 1818) +*
Dicrotendipes pallidicornis (Goetghebuer, 1934) +

Dicrotendipes pulsus (Walker, 1856) +*
Dicrotendipes tritomus (Kieffer, 1916) +?

Dicrotendipes larvae are common inhabitants of sediments in lakes and occasionally in rivers. One species is tolerant of saline conditions. Nine species are known from the western Palaearctic, six of which are recorded in Ireland.

Dicrotendipes lobiger* (Kieffer, 1921) +

Known Irish and European distribution - Figures 685 and 686.

Status in Ireland: records from 22 locations in 14 HAs (1, 3, 16, 17, 21, 22, 25, 26, 27, 30, 32, 34, 38, 39) in Counties Armagh, Cavan, Clare, Derry, Donegal, Galway, Kerry, Leitrim, Mayo, Roscommon, Waterford and Westmeath.

Dicrotendipes nervosus* (Staeger, 1839) +

Known Irish and European distribution - Figures 687 and 688.

Status in Ireland: records from 53 locations, one on Clare Island and two on Rathlin Island and 50 in 19 HAs (3, 5, 9, 18, 19, 20, 21, 22, 25, 26, 27, 30, 32, 33, 34, 35, 36, 38, 39) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo, Monaghan, Offaly, Roscommon, Sligo, Tyrone, Waterford and Westmeath.

Dicrotendipes notatus* (Meigen, 1818) +

Known Irish and European distribution - Figures 689 and 690.

Status in Ireland: records from 19 locations in ten HAs (3, 7, 9, $11, 22, 23, 30, 32, 38, 39) in Counties Antrim, Cavan, $Dublin, Galway, Kerry, Kildare, Mayo, Meath and $Wexford. [$HA 11 and Wexford in Murray (2017a); Dublin in Murray and Ashe (2017)].

***Dicrotendipes pallidicornis* (Goetghebuer, 1934) +**

Known Irish and European distribution - Figures 691 and 692.

Status in Ireland: there is one record in HA 32, County Mayo.

Comments: the single record of this species is from Lough Furnace, a coastal lagoon in County Mayo. The larvae are tolerant of saline conditions. The distribution in Europe is thus far limited to Ireland, Great Britain, France, Corsica, the Netherlands, Crete and Spain (not Portugal).

Dicrotendipes pulsus* (Walker, 1856) +

Known Irish and European distribution - Figures 693 and 694.

Status in Ireland: records from 95 locations in 28 HAs (1, 3, 5, 7, 10, 13, 16, 17, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo, Monaghan, Roscommon, Sligo, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

***Dicrotendipes tritomus* (Kieffer, 1916) +?**

Known Irish and European distribution - Figures 695 and 696.

Status in Ireland: records from 33 locations in 15 HAs (7, 10, 19, 20, 21, 22, 23, 25, 28, 30, 31, 32, 36, 38, 39) in Counties Cavan, Clare, Cork, Donegal, Galway, Kerry, Mayo, Westmeath and Wicklow.

EINFELDIA Kieffer, 1924

Einfeldia pagana (Meigen, 1838) +

Einfeldia larvae are detritivores in sediments of lakes and ponds and are often found in eutrophic conditions. Three species are known from the western Palaearctic, one of which is on record from Ireland.

Einfeldia pagana (Meigen, 1838) +

Known Irish and European distribution - Figures 697 and 698.

Status in Ireland: records from 13 locations in nine HAs (6, 7, 19, 25, 27, 29, 30, 31, 36) in Counties Clare, Cork, Galway, Mayo, Meath, Monaghan and Westmeath. There are no records thus far from Northern Ireland.

ENDOCHIRONOMUS Kieffer, 1918

Endochironomus albipennis (Meigen, 1830) +*

Endochironomus tendens (Fabricius, 1775) +*

Endochironomus larvae live in surface sediments in the littoral region of lakes and slow-flowing rivers, frequently amongst dead and decaying vegetation. Some mine tunnels in leaves and stems of aquatic macrophytes in moderately to highly eutrophic lakes. Four species are known from the western Palaearctic, two of which are on record in Ireland

Endochironomus albipennis (Meigen, 1830) +*

Known Irish and European distribution - Figures 699 and 700.

Status in Ireland: records from 158 locations, two on Rathlin Island and 156 in 25 HAs (1, 3, 5, 6, 7, 9, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 34, 36, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Louth, Mayo, Monaghan, Roscommon, Sligo, Tyrone, Waterford and Westmeath.

Endochironomus tendens (Fabricius, 1775) +*

Known Irish and European distribution - Figures 701 and 702.

Status in Ireland: records from 47 locations, two on Clare Island, four on Rathlin Island and 42 in 19 HAs (3, 5, 9, 10, 19, 20, 21, 22, 25, 26, 27, 28, 30, 31, 32, 34, 34, 36, 38) in Counties Antrim (Rathlin Island only), Clare, Cork, Derry, Donegal, Down, Galway, Kerry, Leitrim, Longford, Mayo, Westmeath and Wicklow.

GLYPTOTENDIPES Kieffer, 1913

Glyptotendipes (*Caulochironomus*) *foliicola* Kieffer sensu Pinder, 1978 +*

Glyptotendipes (*Caulochironomus*) *scirpi* (Kieffer, 1915) +*

Glyptotendipes (*Caulochironomus*) *viridis* (Macquart, 1834) +
Glyptotendipes (*Glyptotendipes*) *barbipes* (Staeger, 1839) +*
Glyptotendipes (*Glyptotendipes*) *cauliginellus* (Kieffer, 1913) +*
Glyptotendipes (*Glyptotendipes*) *glaucus* (Meigen, 1818) +*
Glyptotendipes (*Glyptotendipes*) *pallens* (Meigen, 1804) +*
Glyptotendipes (*Glyptotendipes*) *paripes* (Edwards, 1929) +*
Glyptotendipes (*Heynotendipes*) *signatus* (Kieffer, 1909) +

Glyptotendipes spp. larvae live in detritus-rich sediments of ponds, lakes and slow-flowing rivers. They frequently occur in eutrophic waters. Some species are abundant in sewage oxidation ponds and others are saline tolerant. Spies and Sæther (2004) gave a comprehensive review of confusing nomenclatural issues at genus group level and of Palaearctic *Glyptotendipes* species names and synonyms. Nevertheless three subgenera are currently recognised with 15 species known from the western Palaearctic. Nine species from the three subgenera are on record in Ireland.

Subgenus *CAULOCHIRONOMUS* Heyn, 1993

Glyptotendipes* (*Caulochironomus*) *foliicola* Kieffer sensu Pinder, 1978 +

Known Irish and European distribution - Figures 703 and 704.

Status in Ireland: records from 43 locations in 17 HAs (3, 6, 7, 9, 17, 20, 25, 26, 27, 30, 31, 32, 34, 35, 36, 38, 39) in Counties Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Leitrim, Longford, Louth, Mayo, Monaghan, Roscommon, Waterford and Westmeath.

Comments: the status of *Glyptotendipes* (*C.*) *foliicola* Kieffer in Europe was reviewed by Spies and Sæther (2004) and records of the recognisable morphotype are documented as "doubtfully present" in Fauna Europaea under the name "*G. foliicola* Contreras-Lichtenberg" (Spies and Sæther, 2013). Irrespective of the taxonomic position, records from Ireland and England are based on identifications of adult male specimens from Pinder (1978) or Langton and Pinder (2007) and of pupal exuviae from Langton (1991) and Langton and Visser (2003).

Glyptotendipes* (*Caulochironomus*) *scirpi* (Kieffer, 1915) +

Known Irish and European distribution - Figures 705 and 706.

Status in Ireland: records from 32 locations in 15 HAs (9, 17, 19, 20, 21, 24, 25, 26, 27, 30, 31, 32, 35, 36, 37) in Counties Cavan, Clare, Cork, Donegal, Fermanagh, Galway, Kerry, Limerick, Mayo, Roscommon, Sligo, Waterford, Westmeath and Wicklow.

***Glyptotendipes* (*Caulochironomus*) *viridis* (Macquart, 1834) +**

Known Irish and European distribution - Figures 707 and 708.

Status in Ireland: records from eight locations in four HAs (21, 22, 30, 32) in Counties Clare, Cork, Galway, Kerry and Mayo. There are no confirmed records from Northern Ireland.

Comments: Spies and Sæther (2004) refer to *Glyptotendipes viridis* as "a name of varied usage based on no extant type specimen" and to confusion with *Glyptotendipes imbicilis*

(Walker, 1856) that Contreras-Lichtenberg (2001) synonymised with *G. viridis*. The synonomy was not accepted in Spies and Sæther (2004, 2013). Specimens from Ireland have been identified as adult males from Pinder (1978) or Langton and Pinder (2007) and of pupal exuviae from Langton and Visser (2003).

Subgenus *GLYPTOTENDIPES* Kieffer, 1913

Glyptotendipes* (*Glyptotendipes*) *barbipes* (Staeger, 1839) +

Known Irish and European distribution - Figures 709 and 710.

Status in Ireland: records from 27 locations in 13 HAs (7, 19, 20, 23, 25, 26, 27, 30, 31, 32, 33, 36, 38) in Counties Cavan, Clare, Cork, Donegal, Fermanagh, Galway, Kerry, Leitrim, Mayo and Roscommon.

Glyptotendipes* (*Glyptotendipes*) *cauliginellus* (Kieffer, 1913) +

Known Irish and European distribution - Figures 711 and 712.

Status in Ireland: records from 85 locations, one on Clare Island, four on Rathlin Island and 80 in 18 HAs (3, 13, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 34, 36, 38) in Counties Antrim (Rathlin Island only) Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Mayo , Monaghan, Roscommon, Sligo, Tipperary, Westmeath and Wexford.

Glyptotendipes* (*Glyptotendipes*) *glaucus* (Meigen, 1818) +

Known Irish and European distribution - Figures 713 and 714.

Status in Ireland: records from 17 locations, one on Clare Island and 16 in six HAs (3, 5, 7, 22, 25, 36) and Rathlin Island in Counties Antrim, Cavan, Derry, Down, Fermanagh, Galway, $Monaghan and Kerry. [$Murray and Ashe, 2017].

Glyptotendipes* (*Glyptotendipes*) *pallens* (Meigen, 1804) +

Known Irish and European distribution - Figures 715 and 716.

Status in Ireland: records from 67 locations, one on Clare Island and 66 in 24 HAs (1, 3, 4, 5, 6, 7, 9, $11, $12, 16, 17, 20, 22, 24, 25, 26, 27, 28, 30, 32, 34, 35, 36, 39) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Kerry, Leitrim, Limerick, Louth, Mayo, Monaghan, Offaly, Roscommon, Sligo, Waterford, Westmeath and $Wexford. [$Murray, 2017a].

Glyptotendipes* (*Glyptotendipes*) *paripes* (Edwards, 1929) +

Known Irish and European distribution - Figures 717 and 718.

Status in Ireland: records from 95 locations, two on Clare Island, three on Rathlin Island and 90 in 23 HAs (1, 2, 3, 4, 5, 7, $12, 19, 20, 21, 22, 25, 26, 27, 28, 30, 30, 31, 32, 33, 34, 35, 36) in Counties Antrim, Cavan, Clare, Cork, Derry, Down, Fermanagh, Galway, Kerry, Leitrim, Mayo, Monaghan, Offaly, Roscommon, Tyrone and $Wexford. [$Murray, 2017a].

Subgenus *HEYNOTENDIPES* Spies & Saether, 2004

***Glyptotendipes* (*Heynotendipes*) *signatus* (Kieffer, 1909) +**

Known Irish and European distribution - Figures 719 and 720.

Status in Ireland: records at one location in HA 31, County Galway.

GRACEUS Goetghebuer, 1928

Graceus ambiguus Goetghebuer, 1928 +

There is only one species of *Graceus* known in the western Palaearctic that is also on record in Ireland.

Graceus ambiguus Goetghebuer, 1928 +

Known Irish and European distribution - Figures 721 and 722.

Status in Ireland: records from two locations in two HAs (21, 30) in Counties Cork and Galway.

Comments: the records in Ireland are based on aerial net collection of adults at two lakes. The species is only known from Ireland (not yet recorded in Northern Ireland), Great Britain and the Netherlands. Larvae were reported from a moorland pool in the Netherlands (Cuppen *et al*., 2009).

HARNISCHIA Kieffer, 1921

Harnischia curtilamellata (Malloch, 1915) +*

Harnischia fuscimanus Kieffer, 1921 +

Three species of *Harnischia* are known from the western Palaearctic. Larvae live in soft sediments of unpolluted lakes and slow-flowing rivers. Two species are known from Ireland.

Harnischia curtilamellata (Malloch, 1915) +*

Known Irish and European distribution - Figures 723 and 724.

Status in Ireland: records from 61 locations in 15 HAs (10, 19, 25, 26, 27, 29, 30, 30, 31, 32, 34, 35, 36, 39, 40) in Counties Cavan, Clare, Cork, Donegal, Fermanagh, Galway, Leitrim, Limerick, Longford, Mayo, Offaly, Roscommon, Sligo, Westmeath and Wicklow.

Harnischia fuscimanus Kieffer, 1921 +

Known Irish and European distribution - Figures 725 and 726.

Status in Ireland: record from one location in HA 7, County Meath.

Comments: the species was only recently recorded from the River Boyne in County Meath at the Newgrange UNESCO World Heritage Site by Murray (2015b). It is not known from Northern Ireland.

KIEFFERULUS Goetghebuer, 1922

Kiefferulus tendipediformis (Goetghebuer, 1921) +*

Larvae are known to occur in dystrophic lakes, ponds and ditches. Some records in Ireland are from coastal lagoons indicating a tolerance for saline conditions.

Kiefferulus tendipediformis (Goetghebuer, 1921) +*

Known Irish and European distribution - Figures 727 and 728.

Status in Ireland: records from 16 locations in eight HAs (3, 19, 20, 25, 26, 27, 32, 36) in Counties Antrim, Clare, Cork, Derry, Fermanagh, Galway and Mayo.

LAUTERBORNIELLA Thienemann & Bause, 1913

Lauterborniella agrayloides (Kieffer, 1911) +*

Lauterborniella larvae are unusual amongst the Chironomini in that they construct and live in movable cases. They are found living on aquatic vegetation in lakes and ponds. The single species known from the western Palaearctic also occurs in Ireland.

Lauterborniella agrayloides (Kieffer, 1911) +*

Known Irish and European distribution - Figures 729 and 730.

Status in Ireland: records from 35 locations, one on Clare Island and 34 in 10 HAs (3, 19, 21, 22, 30, 31, 32, 35, 36, 38) in Counties Cork, Derry, Donegal, Galway Kerry, Leitrim and Mayo (Clare Island only).

MICROCHIRONOMUS Kieffer, 1918

Microchironomus deribae (Freeman, 1957) +

Microchironomus tener (Kieffer, 1918) +*

Larvae of *Microchironomus* occur in lakes, rivers and coastal brackish water lagoons. Three species are known from the western Palaearctic and there are records of two in Ireland.

Microchironomus deribae (Freeman, 1957) +

Known Irish and European distribution - Figures 731 and 732.

Status in Ireland: record from HA 9, County Dublin.

Comments: this record is from a specimen captured in the fuel filter system of a helicopter (Murray and O'Connor, 1982). Although the specimen was documented from Ireland, the helicopter of the Irish Air Corps in which the specimen was found had been previously refuelled in France.

Microchironomus tener (Kieffer, 1918) +*

Known Irish and European distribution - Figures 733 and 734.

Status in Ireland: records from 17 locations in eight HAs (7, 19, 25, 26, 30, 35, 36, 39) in Counties Cavan, Clare, Cork, Donegal, Fermanagh, Galway, Leitrim, Monaghan, Offaly, Roscommon, Sligo and Westmeath.

Comments: all records of *Microchironomus tener* in Ireland are from lakes. There are no records from the east or south-east of the country but the species has been recorded in Northern Ireland. It is widely distributed in the western Palaearctic.

MICROTENDIPES Kieffer, 1915

Microtendipes britteni (Edwards, 1929) +*

Microtendipes chloris (Meigen, 1818) +*

Microtendipes confinis (Meigen, 1830) +*

Microtendipes diffinis (Edwards, 1929) +*

Microtendipes nitidus (Meigen, 1818) +*

Microtendipes pedellus (De Geer, 1776) +*

Microtendipes rydalensis (Edwards, 1929) +*
Microtendipes tarsalis (Walker, 1856) +

Microtendipes larvae are detritivorous feeders living predominantly in the littoral and sublittoral zones of lakes and in ponds and in slow-flowing reaches of rivers where they are frequently found in submerged mosses. Ten species are known from the western Palaearctic of which eight are known from Ireland.

Microtendipes britteni* (Edwards, 1929) +

Known Irish and European distribution - Figures 735 and 736.

Status in Ireland: records from five locations in four HAs (3, 25, 27, 36) in Counties Cavan, Clare and Derry.

Microtendipes chloris* (Meigen, 1818) +

Known Irish and European distribution - Figures 737 and 738.

Status in Ireland: records from 79 locations, three on Clare Island and 76 in 27 HAs (1, 3, 4, 7, 8, 9, 12, 19, 20, 21, 22, 23, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Leitrim, Limerick, Mayo, Meath, Roscommon, Tyrone, Westmeath, Wexford and Wicklow.

Microtendipes confinis* (Meigen, 1830) +

Known Irish and European distribution - Figures 739 and 740.

Status in Ireland: records from seven locations in five HAs (3, 12, 15, 26, 30) in Counties Antrim, Carlow, Derry, Kilkenny, Mayo and Roscommon.

Microtendipes diffinis* (Edwards, 1929) +

Known Irish and European distribution - Figures 741 and 742.

Status in Ireland: records from eight locations, one on Clare Island and seven in five HAs (3, 10, 12, 32, 36) and Clare Island in Counties Carlow, Cavan, Derry, Mayo and Wicklow.

Microtendipes nitidus* (Meigen, 1818) +

Known Irish and European distribution - Figures 743 and 744.

Status in Ireland: records from four locations in four HAs (26, 30, 33, 36) in Counties Cavan, Fermanagh, Galway and Mayo.

Microtendipes pedellus* (De Geer, 1776) +

Known Irish and European distribution - Figures 745 and 746.

Status in Ireland: records from 59 locations, two on Clare Island and 57 in 19 HAs (3, 7, 8, 9, 12, 17, 19, 20, 21, 22, 25, 26, 29, 30, 32, 34, 37, 38, 39) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Dublin, Galway, Kerry, Leitrim, Limerick, Mayo , Meath, Offaly, Roscommon, Waterford, Westmeath and Wexford.

Microtendipes rydalensis* (Edwards, 1929) +

Known Irish and European distribution - Figures 747 and 748.

Status in Ireland: records from 46 locations in 19 HAs (3, 12, 15, 18, 20, 21, 22, 25, 26, 27, 30, 31, 32, 33, 34, 36, 37, 38, 39) in Counties Carlow, Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Kilkenny, Limerick, Mayo, Roscommon, Sligo and Tyrone.

***Microtendipes tarsalis* (Walker, 1856) +**

Known Irish and European distribution - Figures 749 and 750.

Status in Ireland: records from five locations in four HAs (7, 22, 26, 32) in Counties Kerry, Leitrim, Mayo and Meath. There are no records thus far from Northern Ireland.

NILOTHAUMA Kieffer, 1921

Nilothauma brayi (Goetghebuer, 1921) +*

Larvae of *Nilothauma* inhabit sediments in the sublittoral zone of lakes. Two species are known from the western Palaearctic, one in Ireland.

Nilothauma brayi* (Goetghebuer, 1921) +

Known Irish and European distribution - Figures 751 and 752.

Status in Ireland: records from seven locations in five HAs (3, 22, 31, 32, 39) in Counties Derry, Donegal, Galway, Kerry and Mayo.

NUBENSIA Spies, 2015

Nubensia nubens (Edwards, 1929) +*

The single known species of *Nubensia* was previously placed in the subgenus *Pentapedilum* of *Polypedilum* that was raised to generic status by Spies (Spies and Dettinger-Klemm, 2015). *Nubensia* larvae occupy habitats in cool waters of oligotrophic to mesotrophic lakes.

Nubensia nubens* (Edwards, 1929) +

Known Irish and European distribution - Figures 753 and 754.

Status in Ireland: records from 50 locations in 16 HAs (19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 38) in Counties Cavan, Clare, Cork, Donegal, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo, Roscommon, Sligo and Westmeath.

OMISUS Townes, 1945

Omisus caledonicus (Edwards, 1932) +

Larvae of *Omisus* are characteristic of dystrophic lakes and ponds in peat cuttings or bog pools. One species is on record in the western Palaearctic and Ireland. There are no records from Northern Ireland.

***Omisus caledonicus* (Edwards, 1932) +**

Known Irish and European distribution - Figures 755 and 756.

Status in Ireland: records from two locations in two HAs (10, 21) in Counties Cork and Wicklow. There are no records from Northern Ireland.

PAGASTIELLA Brundin, 1949

Pagastiella orophila (Edwards, 1929) +*

Larvae of *Pagastiella* are detritivore feeders of lakes and ponds. One species is known from the western Palaearctic and Ireland.

Pagastiella orophila (Edwards, 1929) +*

Known Irish and European distribution - Figures 757 and 758.

Status in Ireland: records from 92 locations, one on Clare Island and 91 in 21 HAs (1, 4, 18, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39) in Counties Antrim, Clare, Cork, Donegal, Fermanagh, Galway, Kerry, Leitrim, Limerick, Mayo, Roscommon, Sligo, Tipperary, Westmeath and Wicklow.

PARACHIRONOMUS Lenz, 1921

Parachironomus cinctellus (Goetghebuer, 1921*)* +*
Parachironomus danicus Lehmann, 1970 +
Parachironomus digitalis (Edwards, 1929) *
Parachironomus frequens (Johannsen, 1905) +*
Parachironomus gracilior (Kieffer, 1918) +*
Parachironomus mauricii (Kruseman, 1933) +?
Parachironomus monochromus (van der Wulp, 1875) +?
Parachironomus parilis (Walker, 1856) +
Parachironomus subalpinus (Goetghebuer, 1932) +
Parachironomus tenuicaudatus (Malloch, 1915) +
Parachironomus varus (Goetghebuer, 1921) +
Parachironomus vitiosus (Goetghebuer, 1921) +*
Parachironomus "Pe 2" sensu Langton, 1984 +*
Parachironomus "pe2a" sensu Langton & Visser, 2003 +
Parachironomus "Pe 3" sensu Langton, 1984 +
Parachironomus "Pe 4" sensu Langton, 1991 +
"? Parachironomus sp. Pe" sensu Langton, 1991 +

The larvae of *Parachironomus* have various lifestyles and live in a wide range of habitats in lakes, ponds, rivers and also in brackish waters. Larvae of some species are leaf miners in submerged vegetation. Nineteen species are known from the western Palaearctic. Eleven of those are known from Ireland while a further five are known as pupal morphotypes.

Parachironomus cinctellus (Goetghebuer, 1921*)* +*

[= *vitiosus* (Goetghebuer) sensu Langton & Visser, 2003]

Known Irish and European distribution - Figures 759 and 760.

Status in Ireland: records from 26 locations, one on Clare island and 25 in 16 HAs (3, 4, 16, 19, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 38) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Galway, Leitrim, Mayo, Roscommon, Sligo and Tipperary.

Comments: Spies and Bolton (2013) highlighted an inaccuracy in the key to pupal exuviae of *Parachironomus* species in Langton and Visser (2003) and point out that pupal exuviae identified as *Parachironomus vitiosus* from that key actually belong to *P. cinctellus.* The species is known from relatively few areas of Europe including Ireland, Great Britain, Belgium, the Netherlands, Germany, Italy, Slovakia, Hungary and Romania.

***Parachironomus danicus* Lehmann, 1970 +**

Known Irish and European distribution - Figures 761 and 762.

Status in Ireland: one record from HA 9 in County Dublin. There are no records from Northern Ireland.

Comments: the Irish records of *Parachironomus danicus* are from pupal exuviae collected by C. F. Humphries, in June 1950, from the lower reaches of the River Dodder. The slide preparations, that had been labelled "*Chironomaria*" by Humphries, were found in her collections and first reported by Murray *et al*. (2015). The species is only known from five European countries - Ireland, Great Britain, Denmark, Germany and Poland.

***Parachironomus digitalis* (Edwards, 1929) ***

Known Irish and European distribution - Figures 763 and 764.

Status in Ireland: records from two locations in HA 3, County Derry. The species is not on record from the Republic of Ireland.

Parachironomus frequens* (Johannsen, 1905) +

Known Irish and European distribution - Figures 765 and 766.

Status in Ireland: records from 19 locations in 12 HAs (3, 7, 20, 22, 26, 29, 30, 32, 33, 34, 36, 39) in Counties Cavan, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Limerick, Mayo and Roscommon.

Parachironomus gracilior* (Kieffer, 1918) +

[syn *arcuatus* (Goetghebuer, 1919)]

Known Irish and European distribution - Figures 767 and 768.

Status in Ireland: records from 111 locations in 29 HAs (1, 3, 6, 7, 9, [$]12, 15, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 40) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kilkenny, Leitrim, Longford, Louth, Mayo, Meath, Monaghan, Roscommon, Sligo, Waterford, Westmeath and [$]Wexford. [[$]Murray, 2017a].

***Parachironomus mauricii* (Kruseman, 1933) +?**

Known Irish and European distribution - Figures 769 and 770.

Status in Ireland: records from one location on Clare Island, County Mayo.

Comments: the records from Clare Island, of adult male specimens determined from Langton and Pinder (2007), are now the only positive records of the species from Ireland - although not on the Irish mainland. The record of *Parachironomus mauricii,* from Lough Mulladerg, County Donegal by Langton (2002) was based on pupal exuviae. That record is now uncertain, although possible, since Spies and Bolton (2013) note that pupal

exuviae identified as *P. mauricii* from Langton and Visser (2003) may belong to *P. mauricii*, *P. biannulatus* or another species of *Parachironomus*. [see also comments on "? *Parachironomus* sp. Pe" below].

***Parachironomus monochromus* (van der Wulp, 1875) +?**

Known Irish and European distribution - Figures 771 and 772.

Status in Ireland: records from six locations in six HAs (15, 16, 19, 31, 37, 38) in Counties Cork, Donegal, Galway, Kilkenny and Waterford. There are no records from Northern Ireland.

***Parachironomus parilis* (Walker, 1856) *+**

Known Irish and European distribution - Figures 773 and 774.

Status in Ireland: records from 15 locations in eight HAs (1, 3, 6, 22, 24, 27, 29, 32) in Counties Clare, Derry, Galway, Limerick, Kerry and Monaghan.

***Parachironomus subalpinus* (Goetghebuer, 1932) +**

Known Irish and European distribution - Figures 775 and 776.

Status in Ireland: record from one location in HA 22, County Kerry. There are no records from Northern Ireland.

Comments: known from Ireland (but not Great Britain) and otherwise only on record in Europe from Sweden, Finland, Germany and Austria.

***Parachironomus tenuicaudatus* (Malloch, 1915) +**

Known Irish and European distribution - Figures 777 and 778.

Status in Ireland: records from 30 locations, two on Clare Island and 28 in 14 HAs (16, 19, 22, 24, 25, 27, 28, 29, 30, 32, 35, 36, 38, 39) in Counties Cavan, Clare, Cork, Donegal, Fermanagh, Galway, Leitrim, Limerick, Mayo (Clare Island only), Monaghan, Offaly, Waterford and Westmeath.

***Parachironomus varus* (Goetghebuer, 1921) +**

Known Irish and European distribution - Figures 779 and 780.

Status in Ireland: records from one location in HA 35, County Sligo.

Comments: *Parachironomus varus* was first reported in Ireland from Lough Carra, County Mayo by Murray (2010) based on identifications of pupal exuviae from Langton and Visser (2003). That record was rescinded in Murray *et al.* (2015), because of uncertainty of the species determination from Langton and Visser (2003), and was included with records of the pupal morphotype *Parachironomus* Pe 4 [see Pe 4 below]. The specimens on which distribution records of *Parachironomus* Pe 4 were based, cited in Murray *et al.* (2015), have been re-examined. Using additional determination features cited in Spies and Bolton (2013), a record of *P. varus* is now confirmed for Ireland from the collections by EPA research officers at Lough Arrow on 9 September 2008 (Grid reference: G789123). The species is known from Great Britain and has a broad distribution in Europe but is not on record from Spain or Portugal.

Parachironomus vitiosus* (Goetghebuer, 1921) +

[= *biannulatus* (Staeger, 1839) as pe in Langton & Visser, 2003]

Known Irish and European distribution - Figures 781 and 782.

Status in Ireland: records from 35 locations, one each on Clare Island and Rathlin Island and 33 in 16 HAs (3, 6, 19, 21, 22, 24, 25, 26, 27, 30, 32, 34, 35, 36, 38, 39) in Counties Antrim (Rathlin Island only), Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Kerry, Leitrim, Limerick, Longford, Mayo, Meath, Monaghan, Offaly, Sligo and Westmeath.

Comments: Spies and Bolton (2013) drew attention to the incorrect association of pupal exuviae identified as *Parachironomus biannulatus* from couplet 245a in the key by Langton and Visser (2003). The correct determination of those exuviae is *P. vitiosus.*

Parachironomus* "Pe 2" sensu Langton, 1984 +

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: records from seven locations in seven HAs (9, 12, 21, 31, 35, 36, 38) in Counties Carlow, Donegal, Fermanagh, Galway, Kerry and Sligo.

***Parachironomus* "pe2a" sensu Langton & Visser, 2003 +**

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: records from six locations in four HAs (26, 28, 33, 35) in Counties Clare, Leitrim and Mayo.

***Parachironomus* "Pe 3" sensu Langton, 1984 +**

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: records from eight locations in six HAs (10, 12, 20, 27, 28, 30) in Counties Clare, Cork, Donegal, Galway, Wexford and Wicklow.

***Parachironomus* "Pe 4" sensu Langton, 1991 +**

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: records from six locations in five HAs (17, 27, 30, 37, 39) in Counties Clare, Donegal, Mayo, Sligo and Waterford.

Comments: Langton (1984) tentatively associated the pupal morphotype *Parachironomus* Pe4 with *Parachironomus varus* (Goetghebuer, 1921). From tenuously associated material, he later (Langton, 1991) suggested that the morphotype did not belong to *P. varus*. Nevertheless in Langton and Visser (2003) the morphotype was considered synonymous with *P. varus* from a "Linked adult male: Langton and Pinder, 2003" in reference to the keys to adult Chironomidae in preparation at that time but which were not published until four years later (Langton and Pinder, 2007). However, Spies and Bolton (2013) drew attention to a continuing uncertainty with that association remarking that exuviae of more than one species will key to *P. varus* sensu Langton and Visser (2003). [see *P. varus* above].

"? *Parachironomus* sp. Pe" sensu Langton, 1991 +

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: records from Clare Island and 33 locations in 15 HAs (6, 7, 19, 20, 22, 24, 26, 27, 29, 30, 31, 32, 33, 38, 39) in Counties Cavan, Clare, Cork, Donegal, Galway, Kerry, Limerick, Mayo, Monaghan, and Roscommon.
Comments: this pupal morphotype, identified from Langton (1991), is rather common in Ireland and will run to *Parachironomus mauricii* in Langton and Visser (2003). However, according to Spies and Bolton (2013), pupal exuviae identified as *P. mauricii* from Langton and Viser (2003) are also linked with other adult *Parachironomus* species - including *P. biannulatus* Goetghebuer and *P. kuzini* Shilova. Records from Ireland based on pupal exuviae reported as "*Parachironomus* sp. cf. *mauricii"* in Murray *et al.* (2015) may belong to *P. mauricii, P. biannulatus* or another species of *Parachironomus.* [see *P. mauricii* above].

***PARACLADOPELMA* Harnisch, 1923**

Paracladopelma camptolabis (Kieffer, 1913) +*
Paracladopelma laminatum (Kieffer, 1921) +*
Paracladopelma nigritulum (Goetghebuer, 1942) +?

Paracladopelma larvae live in sandy environments in streams and mesotrophic and oligotrophic lakes and occasionally are found in soft profundal lake sediments. Eight species of *Paracladopelma* are known in the western Palaearctic, three in Ireland.

Paracladopelma camptolabis* (Kieffer, 1913) +

Known Irish and European distribution - Figures 783 and 784.
Status in Ireland: records from 68 locations in 27 HAs (1, 3, 4, 7, 9, 12, 15, 16, 18, 19, 20, 21, 22, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Dublin, Galway, Kerry, Kildare, Laois, Leitrim, Limerick, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Waterford, Wicklow and [$]Wexford. [[$]Murray, 2017a].

Paracladopelma laminatum* (Kieffer, 1921) +

Known Irish and European distribution - Figures 785 and 786.
Status in Ireland: records from 36 locations in 17 HAs (3, 7, 9, 22, 23, 25, 26, 27, 29, 30, 31, 32, 33, 35, 36, 38, 40) in Counties Antrim, Cavan, Clare, Derry, Donegal, Fermanagh, Galway, Kerry, Mayo, Roscommon, Sligo, Tipperary, Westmeath and Wicklow.

***Paracladopelma nigritulum* (Goetghebuer, 1942) +?**

Known Irish and European distribution - Figures 787 and 788.
Status in Ireland: records from 16 locations in 12 HAs (10, 15, 21, 26, 27, 31, 32, 34, 35, 36, 37, 38) in Counties Clare, Donegal, Galway, Kerry, Laois, Leitrim, Mayo, Monaghan, Sligo and Wicklow.
Comments: there are no records from Northern Ireland. Murray *et al.* (2016) indicate that the records from Donegal and Monaghan were erroneously included in the Northern Ireland listing in Spies and Sæther (2013).

PARALAUTERBORNIELLA Lenz, 1941

Paralauterborniella nigrohalteralis (Malloch, 1915) +*

Larvae of *Paralauterborniella* live in lake littoral soft sediments and are occasionally found in streams. One species is known from the western Palaearctic and that is also on record from Ireland.

Paralauterborniella nigrohalteralis (Malloch, 1915) +*

Known Irish and European distribution - Figures 789 and 790.

Status in Ireland: records from 27 locations in eight HAs (19, 23, 25, 26, 27, 34, 35, 36) in Counties Cavan, Clare, Cork, Fermanagh, Kerry, Leitrim, Mayo, Roscommon and Sligo.

PARATENDIPES Kieffer, 1911

Paratendipes albimanus (Meigen, 1818) +*

Paratendipes nudisquama (Edwards, 1929) +

Paratendipes plebeius (Meigen, 1818) +

Paratendipes larvae are associated with sandy silty substrates in lakes, ponds, streams and rivers. Six species are known from the western Palaearctic, three of which are known from Ireland.

Paratendipes albimanus (Meigen, 1818) +*

Known Irish and European distribution - Figures 791 and 792.

Status in Ireland: records from 96 locations in 25 HAs (1, 2, 3, 4, 7, 8, 9, [$]12, 13, 15, 18, 19, 20, 22, 25, 26, 27, 29, 30, 31, 32, 34, 35, 36, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath and Wexford. [[$]Murray, 2017a].

Paratendipes nudisquama (Edwards, 1929) +

Known Irish and European distribution - Figures 793 and 794.

Status in Ireland: records from three locations in three HAs (25, 26, 30) in Counties Galway, Offaly and Roscommon. There are no records from Northern Ireland.

Paratendipes plebeius (Meigen, 1818) +

Known Irish and European distribution - Figures 795 and 796.

Status in Ireland: records from five locations in five HAs (9, 10, 25, 37, 38) in Counties Antrim, Donegal, Dublin, Wicklow and Westmeath. There are no records from Northern Ireland.

PHAENOPSECTRA Kieffer, 1921

Phaenopsectra flavipes (Meigen, 1818) +*

Phaenopsectra punctipes (Wiedemann, 1817) +

Phaenopsectra "Pe f. Bala" sensu Langton, 1991

Two species of *Phaenopsectra* are known in the western Palaearctic, both are known from Ireland. Larvae live in sandy silt in streams and ponds.

Phaenopsectra flavipes* (Meigen, 1818) +

Known Irish and European distribution - Figures 797 and 798.

Status in Ireland: records from 74 locations, one on Clare Island and 73 in 22 HAs (3, 7, 9, 10, 18, 20, 21, 22, 23, 25, 26, 27, 28, 30, 31, 32, 33, 34, 36, 37, 38, 39) in Counties Antrim, Clare, Cork, Donegal, Dublin, Galway, Kerry, Leitrim, Longford, Mayo, Monaghan, Offaly, Roscommon and Wicklow.

***Phaenopsectra punctipes* (Wiedemann, 1817) +**

Known Irish and European distribution - Figures 799 and 800.

Status in Ireland: records from six locations, one on Clare Island and five in four HAs (7, 22, 32, 35) and Clare Island in Counties Cavan, Kerry, Leitrim and Mayo. There are no records from Northern Ireland.

***Phaenopsectra* "Pe f. Bala" sensu Langton, 1991 +**

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: records from 13 locations in nine HAs (20, 22, 32, 25, 30, 32, 34, 38, 39) in Counties Cork, Donegal, Galway, Kerry and Mayo. There are no records from Northern Ireland.

Comments: it is possible that this pupal morphotype belongs to *Phaenopsectra punctipes* whose exuviae are thus far not described due to a lack of associated material.

***POLYPEDILUM* Kieffer, 1912**

Polypedilum (*Pentapedilum*) *sordens* (van der Wulp, 1874) +*
Polypedilum (*Pentapedilum*) *tritum* (Walker, 1856) +
Polypedilum (*Pentapedilum*) *uncinatum*, Goetghebuer, 1921 +
Polypedilum (*Polypedilum*) *acutum* Kieffer, 1915 +
Polypedilum (*Polypedilum*) *albicorne* (Meigen, 1838) +*
Polypedilum (*Polypedilum*) *arundineti* (Goetghebuer, 1921) +*
Polypedilum (*Polypedilum*) *laetum* (Meigen, 1818) +*
Polypedilum (*Polypedilum*) *nubeculosum* (Meigen, 1804) +*
Polypedilum (*Polypedilum*) *pedestre* (Meigen, 1830) +*
Polypedilum (*Tripodura*) *aegyptium* Kieffer, 1925 +*
Polypedilum (*Tripodura*) *bicrenatum* Kieffer, 1921 +*
Polypedilum (*Tripodura*) *pullum* (Zetterstedt, 1838) +*
Polypedilum (*Tripodura*) *quadriguttatum* Kieffer, 1921 +
Polypedilum (*Tripodura*) *scalaenum* (Schrank, 1803) +*
Polypedilum (*Uresipedilum*) *convictum* (Walker, 1856) +*
Polypedilum (*Uresipedilum*) *cultellatum* Goetghebuer, 1931 +*

Larvae of the genus *Polypedilum* are liable to be found in sediments of virtually all types of lotic and lentic environments from fast flowing rivers and streams to almost

static ditches. They occur in lakes, ponds, water butts, barrells and ephemeral habitats. In Fauna Europaea (Spies and Saether, 2013), 38 species in five subgenera are currently recognized. Sixteen species in four of the subgenera are known to occur in Ireland.

Subgenus *PENTAPEDILUM* Kieffer, 1913

Polypedilum* (*Pentapedilum*) *sordens* (van der Wulp, 1875) +

Known Irish and European distribution - Figures 801 and 802.

Status in Ireland: records from 117 locations, two on Clare Island, one on Rathlin Island and 114 in 29 HAs (1, 2, 3, 4, 6, 7, 9, 10, 12, 15, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 34, 36, 38, 39) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kilkenny, Longford, Louth, Mayo, Monaghan, Offaly, Roscommon, Tipperary, Tyrone, Waterford, Westmeath, Wexford and Wicklow.

***Polypedilum* (*Pentapedilum*) *tritum* (Walker, 1856) +**

Known Irish and European distribution - Figures 803 and 804.

Status in Ireland: records from 19 locations in ten HAs (9, 10, 19, 21, 22, 25, 26, 30, 32, 33) and Clare Island in Counties Clare, Cork, Dublin, Galway, Kerry, Leitrim, Mayo (including Clare Island), [$]Roscommon, Westmeath and Wicklow. There are no records from Northern Ireland. [[$]Murray and Ashe, 2017].

***Polypedilum* (*Pentapedilum*) *uncinatum* Goetghebuer, 1921 +**

Known Irish and European distribution - Figures 805 and 806.

Status in Ireland: records from three locations in three HAs (1, 21, 32) in Counties Clare, Donegal, Galway and Kerry. There are no records from Northern Ireland.

Subgenus *POLYPEDILUM* Kieffer, 1912

***Polypedilum* (*Polypedilum*) *acutum* Kieffer, 1915 +**

Known Irish and European distribution - Figures 807 and 808.

Status in Ireland: records from eight locations. Two on Clare Island and six in four HAs (9, 22, 25, 32) in Counties Dublin, Kerry, Mayo and Westmeath. There are no records from Northern Ireland.

Polypedilum* (*Polypedilum*) *albicorne* (Meigen, 1838) +

Known Irish and European distribution - Figures 809 and 810.

Status in Ireland: records from 73 locations in 23 HAs (1, 2, 3, 4, 5, 9, 10, 12, 15, 18, 20, 21, 22, 25, 30, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Cavan, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kilkenny, Laois, Limerick, Mayo, Sligo, Tyrone and Wicklow.

Polypedilum* (*Polypedilum*) *arundineti* (Goetghebuer, 1921) +

Known Irish and European distribution - Figures 811 and 812.

Status in Ireland: records from seven locations, one on Clare Island, two on Rathlin Island and four in four HAs (3, 20, 22, 33) in Counties Antrim (Rathlin Island only), Cork, Derry, Kerry and Mayo.

Polypedilum* (*Polypedilum*) *laetum* (Meigen, 1818) +

Known Irish and European distribution - Figures 813 and 814.

Status in Ireland: records from 20 locations in nine HAs (1, 3, 9, 10, 12, 20, 25, 37, 38) in Counties Antrim, Cork, Derry, Donegal, Down, Dublin, Galway, Tyrone, Wexford and Wicklow.

Polypedilum* (*Polypedilum*) *nubeculosum* (Meigen, 1804) +

Known Irish and European distribution - Figures 815 and 816.

Status in Ireland: records from 78 locations in 25 HAs (1, 2, 3, 4, 5, 7, 9, 12, 16, 17, 19, 20, 22, 25, 26, 29, 30, 31, 32, 33, 34, 36, 38, 39, 40) in Counties Antrim, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Leitrim, Mayo, Meath, Monaghan, Offaly, Roscommon, Tipperary, Waterford, Wicklow and [$]Wexford. [[$]Murray, 2017a].

Polypedilum* (*Polypedilum*) *pedestre* (Meigen, 1830) +

Known Irish and European distribution - Figures 817 and 818.

Status in Ireland: records from 39 locations, two on Clare Island and 37 in 17 HAs (3, 4, 7, 9, 10, 16, 18, 19, 20, 22, 26, 30, 32, 34, 35, 36, 37) in Counties Antrim, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kildare, Mayo, Meath, Roscommon, Sligo, Tipperary, Waterford and Wicklow.

Subgenus *TRIPODURA* Townes, 1945

Polypedilum* (*Tripodura*) *aegyptium* Kieffer, 1925 +

Known Irish and European distribution - Figures 819 and 820.

Status in Ireland: records from three locations in three HAs (22, 27, 35) in Counties Clare, Fermanagh and Kerry.

Polypedilum* (*Tripodura*) *bicrenatum* Kieffer, 1921 +

Known Irish and European distribution - Figures 821 and 822.

Status in Ireland: records from 12 locations, one on Rathlin Island and 11 in nine HAs (5, 7, 9, 19, 22, 25, 27, 36, 39) in Counties Antrim (Rathlin Island only), Clare, Cork, Donegal, Down, Dublin, Fermanagh, Meath and Westmeath.

Polypedilum* (*Tripodura*) *pullum* (Zetterstedt, 1838) +

Known Irish and European distribution - Figures 823 and 824.

Status in Ireland: records from 48 locations, one on Clare Island and 47 in 22 HAs (1, 2, 3, 4, 7, 9, 10, 15, 21, 22, 23, 25, 26, 27, 30, 32, 34, 35, 36, 38, 39, 40) in Counties Antrim, Cavan, Clare, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Leitrim, Mayo, Meath, Roscommon, Westmeath and Wicklow.

***Polypedilum* (*Tripodura*) *quadriguttatum* Kieffer, 1921 +**

Known Irish and European distribution - Figures 825 and 826.

Status in Ireland: record from one location in HA 7 in County Meath. There are no records from Northern Ireland.

Polypedilum* (*Tripodura*) *scalaenum* (Schrank, 1803) +

Known Irish and European distribution - Figures 827 and 828.

Status in Ireland: records from 15 locations in nine HAs (2, 3, 7, 9, 22, 25, 26, 30, 38) in Counties Derry, Donegal, Galway, Kerry, Meath, Roscommon, Westmeath and Wicklow.

Subgenus *URESIPEDILUM* Oyewo & Sæther, 1998

Polypedilum* (*Uresipedilum*) *convictum* (Walker, 1856) +

Known Irish and European distribution - Figures 829 and 830.

Status in Ireland: records from 110 locations in 24 HAs (1, 2, 3, 4, 6, 7, 9, 12, 15, 18, 20, 21, 22, 25, 26, 30, 32, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tyrone, Waterford, Wexford and Wicklow.

Polypedilum* (*Uresipedilum*) *cultellatum* Goetghebuer, 1931 +

Known Irish and European distribution - Figures 831 and 832.

Status in Ireland: records from 45 locations in 17 HAs (3, 7, 9, 10, 12, 15, 18, 20, 21, 22, 25, 26, 30, 34, 35, 36, 39) in Counties Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Westmeath, Wexford and Wicklow.

SAETHERIA Jackson, 1977

Saetheria reissi Jackson, 1977 +

Larvae of *Saetheria* live in sandy substrates of lakes and streams. Two species are known from the western Palaearctic, one of which is known from Ireland.

***Saetheria reissi* Jackson, 1977 +**

Known Irish and European distribution - Figures 833 and 834.

Status in Ireland: record from one location in HA 15, County Laois. The species is not known from Northern Ireland.

Comments: *Saetheria reissi* is not known from Great Britain or Iceland and has a sporadic distribution in central and northern Europe. There are no records in southern regions in Italy, Spain or Portugal.

SERGENTIA Kieffer, 1922

Sergentia coracina (Zetterstedt, 1850) +

Larvae of *Sergentia* are typical of oligotrophic and mesotrophic lakes where they occupy habitats in sublittoral and profundal zones. Four species are known from the western Palaearctic, only one of which has been found in Ireland.

***Sergentia coracina* (Zetterstedt, 1850) +**

Known Irish and European distribution - Figures 835 and 836.

Status in Ireland: records from 18 locations in 9 HAs (10, 20, 22, 26, 27, 30, 32, 34, 38) in Counties Clare, Cork, Donegal, Galway, Kerry, Mayo, Roscommon and Wicklow. The species is not yet recorded from Northern Ireland.

***STENOCHIRONOMUS* Kieffer, 1919**

Stenochironomus (*Stenochironomus*) *gibbus* (Fabricius, 1794) +
Stenochironomus (? subgenus) *hibernicus* (Edwards, 1929) +
Stenochironomus (*Stenochironomus*) "Pe 2" sensu Langton 1991 +

Stenochironomus larvae are obligate miners of dead vegetation and decaying wood. In the western Palaearctic, two subgenera are recognised *viz. Stenochironomus* Fabricius, 1794 and *Petalopholeus* Borkent, 1984. The latter genus is well represented in Nearctic and Neotropical Regions and one species is widely distributed in the western Palaearctic but not in Ireland. Two species of *Stenochironomus* sensu stricto are known from the western Palaearctic. Another two species are recognised but as yet subgeneric placement is uncertain. Two species are known from Ireland, including one with uncertain generic placement, along with a distinct pupal morphotype.

Subgenus *STENOCHIRONOMUS* Fabricius, 1794

Stenochironomus* (*Stenochironomus*) *gibbus* (Fabricius, 1794) +

Known Irish and European distribution - Figures 837 and 838.

Status in Ireland: records from ten locations in six HAs (3, 7, 22, 35, 36, 39) in Counties Cavan, Cork, Derry, Donegal, Kerry, Mayo and Meath.

***Stenochironomus* (*Stenochironomus*) "Pe 2" sensu Langton, 1991 +**

Distribution - Figures are not given for this pupal morphotype.

Status in Ireland: there are two records from two locations in two HAs (25, 34) in Counties Clare and Mayo.

Comments: exuviae of this morphotype, described as "*Stenochironomus* Pe 2" by Langton (1991) and later as "*Stenochironomus* pe2" in Langton and Visser (2003), are tentatively linked with *Stenochironomus hibernicus*. If this association is correct, the known Irish distribution of the species is extended northwards from County Kerry in the west of Ireland to County Mayo.

***Stenochironomus* (? subgenus) *hibernicus* (Edwards, 1929) +**

Known Irish and European distribution - Figures 839 and 840.

Status in Ireland: record from one location in HA 22, County Kerry.

Comments: the only Irish record of this species is by Edwards (1929) who described it as *Microtendipes hibernicus* from specimens he collected in south-west Ireland near Killarney, County Kerry. Since the immature stages are unknown it is not possible to assign the species to one of the two recognised subgenera. The species is known from several western Palaearctic countries including Ireland, Great Britain, Sweden, Finland, Latvia, North European Russia, Germany, the Netherlands and Romania.

***STICTOCHIRONOMUS* Kieffer, 1919**

Stictochironomus maculipennis (Meigen, 1818) +*
Stictochironomus pictulus (Meigen, 1830) +*
Stictochironomus rosenscholdi (Zetterstedt, 1838) +

Stictochironomus sticticus (Fabricius, 1781) +*

Stictochironomus larvae are typical of oligotrophic and mesotrophic lakes living in profundal soft sediments or sandy littoral sediments and also in clean slow flowing rivers.

Stictochironomus maculipennis* (Meigen, 1818) +

Known Irish and European distribution - Figures 841 and 842.

Status in Ireland: records from eight locations in four HAs (3, 7, 27, 36) in Counties Antrim, Clare, Derry, Fermanagh and Meath.

Stictochironomus pictulus* (Meigen, 1830) +

Known Irish and European distribution - Figures 843 and 844.

Status in Ireland: records from 35 locations in 15 HAs (1, 2, 3, 19, 22, 23, 25, 26, 30, 32, 33, 34, 36, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Mayo, Roscommon, Sligo, Tyrone and Westmeath.

***Stictochironomus rosenscholdi* (Zetterstedt, 1838) +**

Known Irish and European distribution - Figures 845 and 846.

Status in Ireland: records from three locations in two HAs (19, 22) in Counties Cork and Kerry.

Stictochironomus sticticus* (Fabricius, 1781) +

Known Irish and European distribution - Figures 847 and 848.

Status in Ireland: records from 25 locations in 13 HAs (3, 7, 10, 21, 25, 26, 29, 30, 32, 33, 34, 36, 38) in Counties Antrim, Clare, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Mayo, Meath, Tipperary, Westmeath and Wicklow.

SYNENDOTENDIPES Grodhaus, 1987

Synendotendipes dispar (Meigen, 1830) +*

Synendotendipes impar (Walker, 1856) +*

Larvae of *Synendotendipes* occur in standing and slow-flowing rivers where they are obligate or facultative leaf miners of aquatic plants. Three species are known from the western Palaearctic, two of which have been recorded in Ireland.

Synendotendipes dispar* (Meigen, 1830) +

Known Irish and European distribution - Figures 849 and 850.

Status in Ireland: there are records from 11 locations in six HAs (1, 3, 22, 32, 37, 38) in Counties Antrim, Cavan, Derry, Donegal, Kerry and Mayo.

Synendotendipes impar* (Walker, 1856) +

Known Irish and European distribution - Figures 851 and 852.

Status in Ireland: records from three locations in two HAs (7, 30) in Counties Cavan and Galway.

TRIBELOS Townes, 1945

Tribelos intextum (Walker, 1856) +*

Three species are described from the western Palaearctic, one of which is on record in Ireland. Larvae of *Tribelos intextum* inhabit sediments in small lakes and reservoirs, and occasionally in slow-flowing streams.

Tribelos intextum* (Walker, 1856) +

Known Irish and European distribution - Figures 853 and 854.

Status in Ireland: records from 12 locations in nine HAs (1, 3, 4, 7, 9, 25, 30, 35, 36) in Counties Antrim, Cavan, Derry, Dublin, Fermanagh, Galway and Leitrim.

Comments: the first published records of this species in Ireland were from Northern Ireland by Langton (2002). An earlier and previously unpublished record by C. F. Humphries in her collections in May 1946 from the Bohernabreena Reservoir, County Dublin was documented in Murray *et al*. (2015).

XENOCHIRONOMUS Kieffer, 1921

Xenochironomus xenolabis (Kieffer, 1916) +*

Larvae of this species are obligate miners in freshwater sponges.

Xenochironomus xenolabis* (Kieffer, 1916) +

Known Irish and European distribution - Figures 855 and 856.

Status in Ireland: records from 73 locations in 22 HAs (2, 3, 6, 7, 10, 15, 18, 20, 21, 22, 24, 25, 26, 28, 30, 31, 32, 33, 35, 37, 38, 39) in Counties Antrim, Clare, Cork, Derry, Donegal, Galway, Kerry, Kilkenny, Leitrim, Limerick, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Waterford, Westmeath and Wicklow.

Tribe Pseudochironomini Sæther, 1977

PSEUDOCHIRONOMUS Malloch, 1915

Pseudochironomus prasinatus (Staeger, 1839) +*

Pseudochironomus larvae are typically found in sandy or fine gravel sediments in the littoral to sublittoral regions of northern or mountain lakes and are typical of oligotrophic or mesotrophic waters.

Pseudochironomus prasinatus* (Staeger, 1839) +

Known Irish and European distribution - Figures 857 and 858.

Status in Ireland: this is a widespread species with records from 123 locations, one each on Clare Island and Rathlin Island and 121 in 25 HAs (1, 3, 7, 10, 16, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Antrim (Rathlin Island only), Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo, Monaghan, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Westmeath and Wicklow.

Comments: the majority of Irish records are from lakes in the western half of the country. In Europe, the species is known from mountainous regions but it has not yet been recorded from most of south-eastern and eastern parts of Europe or the Iberian Peninsula.

Tribe Tanytarsini Zavřel, 1917

CLADOTANYTARSUS Kieffer, 1921

Cladotanytarsus (*Cladotanytarsus*) *atridorsum* Kieffer, 1924 +*
Cladotanytarsus (*Cladotanytarsus*) *difficilis* Brundin, 1947 +?
Cladotanytarsus (*Cladotanytarsus*) *iucundus* Hirvenoja, 1962 +
Cladotanytarsus (*Cladotanytarsus*) *lepidocalcar* Krüger, 1938 +
Cladotanytarsus (*Cladotanytarsus*) *mancus* (Walker, 1856) +*
Cladotanytarsus (*Cladotanytarsus*) *nigrovittatus* (Goetghebuer, 1922) +*
Cladotanytarsus (*Cladotanytarsus*) *pallidus* Kieffer, 1922 +*
Cladotanytarsus (*Cladotanytarsus*) *vanderwulpi* (Edwards, 1929) +*

Two subgenera are recognised in *Cladotanytarsus*. The nominal subgenus *Cladotanytarsus* Kieffer and the subgenus *Lenziella* Kieffer, 1922 that was resurrected by Gilka (2011). Two species of *Cladotanytarsus* (*Lenziella*) are known from the western Palaearctic that are not known from Great Britain or Ireland. Seventeen species of *Cladotanytarsus* (*Cladotanytarsus*) are known from the western Palaearctic whose larvae occupy a range of habitats in rivers, streams, lakes, pools, springs and occasionally in brackish water. Eight are on record from rivers and lakes in Ireland. Seven are commonly found in Ireland but one, *C. difficilis* Brundin, has been found at only two locations.

Cladotanytarsus (*Cladotanytarsus*) *atridorsum* Kieffer, 1924 +*

Known Irish and European distribution - Figures 859 and 860.

Status in Ireland: records from 121 locations, two each on Clare Island and Rathlin Island and 117 in 28 HAs (1, 3, 5, 7, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Armagh, Cavan, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Laois, Leitrim, Limerick, Longford, Mayo, Offaly, Roscommon, Sligo, Tipperary, Waterford and Westmeath.

Comments: *Cladotanytarsus* (*C.*) *atridorsum* is a widely distributed species in Ireland and also has a widespread distribution in western Europe but lacking records from the Balkans and parts of eastern Europe.

Cladotanytarsus (*Cladotanytarsus*) *difficilis* Brundin, 1947 +?

Known Irish and European distribution - Figures 861 and 862.

Status in Ireland: records from two locations in two HAs (7, 25) in Counties Cavan and Clare.

Comments: this is a rare species in Ireland. Murray *et al*. (2016) indicated that the record by Langton (2002) from County Cavan, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Thus, while it is likely to occur, there are no records of the species to date from Northern Ireland. Records from Europe are sporadic. It was described from Sweden and while it has been documented from Finland, it is thus far unknown in Norway. Records also exist from Great Britain, Estonia, Germany, Poland, Central European Russia and Romania

but it has not been recorded from western mainland Europe and circum Mediterranean countries.

***Cladotanytarsus* (*Cladotanytarsus*) *iucundus* Hirvenoja, 1962 +**

Known Irish and European distribution - Figures 863 and 864.

Status in Ireland: records from 12 locations in the west and south-west of Ireland in 9 HAs (1, 20, 23, 27, 28, 32, 35, 36, 38) and Counties Clare, Cork, Donegal, Kerry, Mayo and Sligo.

***Cladotanytarsus* (*Cladotanytarsus*) *lepidocalcar* Krüger, 1938 +**

Known Irish and European distribution - Figures 865 and 866.

Status in Ireland: records from 23 locations in 12 HAs (6, 7, 10, 17, 22, 26, 27, 30, 33, 36, 38, 39) in Counties Clare, Donegal, Galway, Kerry, Leitrim, Louth, Mayo, Monaghan, Roscommon, Sligo, Waterford, Westmeath and Wicklow.

Cladotanytarsus* (*Cladotanytarsus*) *mancus* (Walker, 1856) +

Known Irish and European distribution - Figures 867 and 868.

Status in Ireland: records from 72 locations, one on Rathlin Island and 71 in 19 HAs (1, 3, 7, 16, 19, 22, 24, 25, 26, 27, 28, 30, 32, 33, 34, 36, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Limerick, Mayo, Roscommon, Sligo, Tipperary, Waterford and Westmeath.

Cladotanytarsus* (*Cladotanytarsus*) *nigrovittatus* (Goetghebuer, 1922) +

Known Irish and European distribution - Figures 869 and 870.

Status in Ireland: records from 20 locations, one on Rathlin Island and 19 in 12 HAs (7, 19, 20, 25, 26, 27, 28, 32, 34, 36, 38, 39) in Counties Antrim (Rathlin Island only), Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Mayo, Offaly, Roscommon and Wicklow.

Cladotanytarsus* (*Cladotanytarsus*) *pallidus* Kieffer, 1922 +

Known Irish and European distribution - Figures 871 and 872.

Status in Ireland: records from 44 locations in 18 HAs (1, 2, 7, 16, 17, 21, 22, 25, 26, 27, 29, 30, 31, 32, 34, 36, 38, 39) in Counties Antrim, Clare, Derry, Donegal, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo, Roscommon, Waterford and Westmeath.

Cladotanytarsus* (*Cladotanytarsus*) *vanderwulpi* (Edwards, 1929) +

Known Irish and European distribution - Figures 873 and 874.

Status in Ireland: records from 63 locations in 21 HAs (1, 2, 3, 4, 6, 7, 11, 12, 15, 18, 20, 21, 22, 25, 26, 31, 32, 34, 35, 39, 40) in Counties Antrim, Carlow, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kilkenny, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Wexford and Wicklow.

***CORYNOCERA* Zetterstedt, 1838**

Corynocera ambigua* Zetterstedt, 1837 +

Known Irish and European distribution - Figures 875 and 876.

Status in Ireland: records from three locations in two HAs (3, 30) in Counties Derry (Lough Neagh) and Galway (Loughs Corrib and Mask).
Comments: larvae of *Corynocera ambigua* live in muddy sediments of lakes. The species was previously regarded as a cold stenotherm and was often regarded as an arctic glacial relict. However, it is now known from a broad range of warm temperate lakes varying from oligotrophic to eutrophic. It was first recorded in Ireland by Murray and Ashe (1983) and later by McLarnon and Carter (2000) from Lough Neagh, Northern Ireland and from Lough Mask by Ashe *et al.* (2000a) who also provide a brief review of its ecology. *C. ambigua* has a circumpolar distribution.

***MICROPSECTRA* Kieffer, 1909**

Micropsectra apposita (Walker, 1856) +*
= *contracta* Reiss, 1965
Micropsectra aristata Pinder, 1976 +
Micropsectra atrofasciata (Kieffer, 1911) +*
Micropsectra attenuata Reiss, 1969 +
Micropsectra junci (Meigen, 1818) +*
Micropsectra lindebergi Säwedal, 1976 +*
Micropsectra lindrothi Goetghebuer, 1931 +*
Micropsectra logani (Johannsen, 1928) +
= *groenlandica* Andersen, 1937
Micropsectra nana (Meigen, 1818) +
Micropsectra notescens (Walker, 1856) +*
Micropsectra pallidula (Meigen, 1830) +*
= *bidentata* (Goetghebuer) sensu Pinder, 1978
Micropsectra roseiventris (Kieffer, 1909) +*
Micropsectra uliginosa (Reiss, 1969) +

Forty six species of *Micropsectra* are known from the western Palaearctic. Thirteen are known from Ireland including two, *M. nana* (Meigen) and *M. uliginosa* (Reiss), formerly in the genus *Parapsectra* that, following a review by Ekrem *et al.* (2010), is now considered a junior synonym of *Micropsectra.* Larvae of *Micropsectra* spp. are known from a variety of habitats in streams, rivers and lakes.

Micropsectra apposita* (Walker, 1856) +

[= *contracta* Reiss, 1965]

Known Irish and European distribution - Figures 877 and 878.
Status in Ireland: records from 55 locations in 20 HAs (1, 3, 4, 7, 8, 9, 12, 15, 16, 22, 25, 26, 30, 32, 33, 34, 35, 36, 37, 38) in Counties Antrim, Cavan, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Mayo, Meath, Roscommon, Sligo, Tipperary and Wexford.

***Micropsectra aristata* Pinder, 1976 +**

Known Irish and European distribution - Figures 879 and 880.

Status in Ireland: records from 16 locations in nine HAs (10, 12, 20, 25, 28, 33, 35, 37, 39) in Counties Carlow, Clare Cork, Donegal, Mayo, Offaly, Sligo and Wexford. There are no records from Northern Ireland.

Micropsectra atrofasciata* (Kieffer, 1911) +

Known Irish and European distribution - Figures 881 and 882.

Status in Ireland: records from 144 locations, four on Clare island and 140 in 27 HAs (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 18, 22, 25, 26, 28, 30, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Wexford and Wicklow.

***Micropsectra attenuata* Reiss, 1969 +**

Known Irish and European distribution - Figures 883 and 884.

Status in Ireland: records from two locations in two HAs (7, 32) in Counties Mayo and Meath.

Micropsectra junci* (Meigen, 1818) +

Known Irish and European distribution - Figures 885 and 886.

Status in Ireland: records from 31 locations, three on Clare Island and 28 in ten HAs (3, 4, 7, 8, 9, 21, 32, 36, 38, 39) in Counties Antrim, Cavan, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Mayo and Meath.

Micropsectra lindebergi* Säwedal, 1976 +

Known Irish and European distribution - Figures 887 and 888.

Status in Ireland: records from 14 locations in nine HAs (10, 18, 22, 26, 32, 33, 36, 37, 38) in Counties Donegal, Fermanagh, Kerry, Mayo, Roscommon, Tipperary and Wicklow.

Micropsectra lindrothi* Goetghebuer, 1931 +

Known Irish and European distribution - Figures 889 and 890.

Status in Ireland: records from 60 locations, two on Clare Island and 58 in 21 HAs (1, 2, 3, 4, 7, 8, 9, [$]11, 12, 13, 15, 18, 20, 21, 22, 25, 26, 30, 35, 36, 39) in Counties Antrim, Carlow, Cavan, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Laois, Leitrim, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone and Wexford. [[$]Murray, 2017a].

***Micropsectra logani* (Johannsen, 1928) +**

[= *groenlandica* Andersen, 1937]

Known Irish and European distribution Figures - 891 and 892.

Status in Ireland: Records from two locations in two HAs (8, 9) in Counties Dublin and Meath.

***Micropsectra nana* (Meigen, 1818) +**

Known Irish and European distribution - Figures 893 and 894.

Status in Ireland: records from three locations in two HAs (32, 38) in Counties Donegal and Mayo.

Micropsectra notescens* (Walker, 1856) +

Known Irish and European distribution - Figures 895 and 896.

Status in Ireland: records from 47 locations in 16 HAs (1, 2, 3, 4, 7, 8, 10, $12, 22, 25, 30, 32, 35, 36, 38, 39) in Counties Antrim, Clare, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Mayo, Meath, Offaly, $Wexford and Wicklow. [$Murray, 2017a].

Micropsectra pallidula* (Meigen, 1830) +

[= *M. bidentata* (Goetghebuer) sensu Pinder, 1978].

Known Irish and European distribution - Figures 897 and 898.

Status in Ireland: records from 110 locations, one on Clare Island and 109 in 28 HAs (1, 2, 3, 4, 5, 7, 8, 9, 10, $11, 12, 15, 18, 20, $21, 22, 25, 26, 27, 30, 32, 33, 34, 35, 36, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Dublin, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Limerick, Louth, Mayo, Meath, Roscommon, Sligo, Tipperary, Tyrone, Wexford and Wicklow. [$HA11 in Murray (2017a); HA 21 in Murray and Ashe (2017)].

Micropsectra roseiventris* (Kieffer, 1909) +

[= *fusca* auct. nec (Meigen, 1804)]

Known Irish and European distribution - Figures 899 and 900.

Status in Ireland: records from 47 locations, three on Clare Island and 44 in 16 HAs (2, 3, 7, 8, 9, 10, 18, 22, 26, 28, 32, 33, 35, 36, 38, 39) in Counties Clare, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim, Mayo, Meath, Monaghan, $Roscommon, Tipperary and Wicklow. [$Murray and Ashe, 2017].

***Micropsectra uliginosa* (Reiss, 1969) +**

Known Irish and European distribution - Figures 901 and 902.

Status in Ireland: records from one location in HA 35, County Leitrim. There are no records from Northern Ireland.

***NEOZAVRELIA* Goetghebuer, 1941**

Neozavrelia cuneipennis (Edwards, 1929) +

Neozavrelia luteola Goetghebuer & Thienemann, 1941 +

Larvae of *Neozavrelia* occur in a variety of habitats in streams, rivers, lakes and bog pools. The genus contains 23 species worldwide (Ekrem, 2006) and five species are currently recognised in the western Palaearctic, two of which are known from Ireland.

***Neozavrelia cuneipennis* (Edwards, 1929) +**

Known Irish and European distribution - Figures 903 and 904.

Status in Ireland: records from 13 locations in eight HAs (10, 22, 30, 31, 32, 34, 36, 38) in Counties Donegal, Galway, Kerry, Mayo and Wicklow. There are no records from Northern Ireland.
Comments: the species has a somewht scattered distribution in Europe including Ireland, Great Britain, Norway, Finland, France, Germany, Austria, Corsica and Romania.

Neozavrelia luteola Goetghebuer & Thienemann, 1941 +

Known Irish and European distribution - Figures 905 and 906.
Status in Ireland: records from eight locations in five HAs (18, 21, 22, 32, 38) in Counties Donegal, Kerry, Mayo and Tipperary. There are no records from Northern Ireland.

PARATANYTARSUS Thienemann & Bause, 1913

Paratanytarsus austriacus (Kieffer, 1924) +*
Paratanytarsus bituberculatus (Edwards, 1929) +
Paratanytarsus brevicalcar (Kieffer, 1909) +
Paratanytarsus dimorphis Reiss, 1965 +
Paratanytarsus dissimilis (Johannsen, 1905) +*
Paratanytarsus grimmii (Schneider, 1885) +*
Paratanytarsus inopertus (Walker, 1856) +*
Paratanytarsus laccophilus (Edwards, 1929) +
Paratanytarsus laetipes (Zetterstedt, 1850) +
Paratanytarsus lauterborni (Kieffer, 1909) +*
Paratanytarsus penicillatus (Goetghebuer, 1928) +
Paratanytarsus tenellulus (Goetghebuer, 1921) +*
Paratanytarsus tenuis (Meigen, 1830) +*

Larvae of the genus *Paratanytarsus* are eurytopic and are known from a variety of habitats in flowing and static waters and also in marshes, bog pools and brackish ponds. Some species are parthenogenetic and one at least, *Paratanytarsus grimmi*, is a pest species of water supply systems. Nineteen species are recorded in the western Palaearctic of which 13 are currently known from Ireland.

Paratanytarsus austriacus (Kieffer, 1924) +*

Known Irish and European distribution - Figures 907 and 908.
Status in Ireland: records from 11 locations in eight HAs (1, 2, 3, 7, 8, 26, 36, 39) in Counties Cavan, Derry, Donegal, Longford, Meath and Roscommon.

Paratanytarsus bituberculatus (Edwards, 1929) +

Known Irish and European distribution - Figures 909 and 910.
Status in Ireland: records from 21 locations in 12 HAs (7, $12, 16, 22, 25, 26, 27, 30, 31, 32, 36, 38) in Counties Clare, Derry, Donegal, Galway, Kerry, Mayo, Meath,

Roscommon, Sligo, Waterford, Westmeath and [$]Wexford. There are no records from Northern Ireland. [[$]Murray, 2017a].

***Paratanytarsus brevicalcar* (Kieffer, 1909) +**

[syn *intricatus* (Goetghebuer, 1921)]

Known Irish and European distribution - Figures 911 and 912.

Status in Ireland: records from four locations, one on Clare Island and three in three HAs (20, 26, 32) in Counties Cork, Mayo and Roscommon.

***Paratanytarsus dimorphis* Reiss, 1965 +**

Known Irish and European distribution - Figures 913 and 914.

Status in Ireland: records from four locations in three HAs (9, 26, 30) in Counties Galway, Kildare and Westmeath.

Paratanytarsus dissimilis* (Johannsen, 1905) +

Known Irish and European distribution - Figures 915 and 916.

Status in Ireland: records from 55 locations in 21 HAs (1, 2, 3, 4, 6, 7, [$]9, 11, 16, 19, 20, 22, 26, 27, 30, 31, 32, 34, 36, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Down, [$]Dublin, Fermanagh, Galway, Kerry, Leitrim, Longford, Mayo, Meath, Monaghan, Roscommon, Tipperary, Westmeath and Wexford. [[$]Murray and Ashe, 2017]

Paratanytarsus grimmii* (Schneider, 1885) +

Known Irish and European distribution - Figures 917 and 918.

Status in Ireland: records from three locations in three HAs (3, 26, 39) in Counties Derry, Donegal, Roscommon and Westmeath.

Paratanytarsus inopertus* (Walker, 1856) +

Known Irish and European distribution - Figures 919 and 920.

Status in Ireland: records from 136 locations in 26 HAs (1, 3, 4, 6, 7, 9, 12, 15, 17, 18, 19, 20, 22, 25, 26, 27, 28, 30, 31, 32, 34, 35, 36, 37, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kildare, Kilkenny, Laois, Leitrim, Limerick, Longford, Mayo, Meath, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Waterford, Westmeath, Wexford and Wicklow.

Comments: *Paratanytarsus inopertus* is the most commonly encountered species of the genus *Paratanytarsus* in Ireland with records predominantly from lakes and ponds and a lesser number from rivers. While it is widely distributed in Europe, there are no records to date from Norway, the Czech Republic, Moldova or the Balkan countries.

***Paratanytarsus laccophilus* (Edwards, 1929) +**

Known Irish and European distribution - Figures 921 and 922.

Status in Ireland: records from 40 locations in 19 HAs (1, 9, 16, 17, 19, 20, 22, 24, 25, 26, 27, 29, 30, 32, 33, 34, 35, 37, 38) in Counties Clare, Cork, Derry, Donegal, Galway, Kerry, Limerick, Mayo, Roscommon, Sligo, Waterford, Westmeath and Wicklow.

***Paratanytarsus laetipes* (Zetterstedt, 1850) +**

Known Irish and European distribution - Figures 923 and 924.

Status in Ireland: records from 18 locations in ten HAs (6, 21, 22, 26, 27, 30, 31, 32, 36, 38) in Counties Cavan, Clare, Donegal, Fermanagh, Galway, Kerry, Mayo, Monaghan and Roscommon.

Paratanytarsus lauterborni* (Kieffer, 1909) +

Known Irish and European distribution - Figures 925 and 926.

Status in Ireland: records from 11 locations, one on Rathlin Island and ten in 8 HAs (1, 3, 15, 21, 22, 27, 30, 31) in Counties Antrim, Clare, Derry, Galway, Kerry and Kilkenny.

***Paratanytarsus penicillatus* (Goetghebuer, 1928) +**

Known Irish and European distribution - Figures 927 and 928.

Status in Ireland: records from 34 locations in 17 HAs (1, 3, 10, 19, 21, 22, 25, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38) in Counties Clare, Cork, Derry, Donegal, Galway, Kerry, Mayo, Sligo and Wicklow. There are no records from Northern Ireland.

Paratanytarsus tenellulus* (Goetghebuer, 1921) +

Known Irish and European distribution - Figures 929 and 930.

Status in Ireland: records from nine locations in six HAs (3, 5, 25, 26, 27, 38) in Counties Clare, Derry, Donegal, Down and Mayo.

Paratanytarsus tenuis* (Meigen, 1830) +

Known Irish and European distribution - Figures 931 and 932.

Status in Ireland: records from 43 locations in 14 HAs (9, 20, 21, 22, 23, 25, 26, 27, 30, 31, 32, 36, 37, 38) in Counties Clare, Cork, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim, Mayo, Roscommon and Westmeath.

RHEOTANYTARSUS Thienemann & Bause, 1913

Rheotanytarsus curtistylus (Goetghebuer, 1921) +*
Rheotanytarsus muscicola Thienemann, 1929 *
Rheotanytarsus nigricauda Fittkau, 1960 +
Rheotanytarsus pellucidus (Walker, 1848) +*
Rheotanytarsus pentapoda (Kieffer, 1909) +*
Rheotanytarsus photophilus (Goetghebuer, 1921) +*
Rheotanytarsus reissi Lehmann, 1970 +
Rheotanytarsus rhenanus Klink, 1983 +*
Rheotanytarsus rioensis Langton & Armitage, 1995 +

Thirteen species of *Rheotanytarsus* are on record from the western Palaearctic of which nine species are found in Ireland, predominantly in rivers but also in some lakes. The larvae are characteristically rheobiontic, living in streams and rivers, including the lower reaches of large rivers, the littoral region of lakes where wind and wave action promotes currents (Epler *et al*., 2013)

Rheotanytarsus curtistylus* (Goetghebuer, 1921) +

Known Irish and European distribution - Figures 933 and 934.

Status in Ireland: records from 15 locations, three on Clare Island and 12 in seven HAs (1, 7, 12, 26, 28, 30, 38) in Counties Clare, Derry, Donegal, Galway, Kildare, Leitrim, Mayo (Clare Island only), Roscommon and Wexford.

***Rheotanytarsus muscicola* Thienemann, 1929 ***

Known Irish and European distribution - Figures 935 and 936.

Status in Ireland: records from five locations in three HAs (1, 3, 36) in Counties Derry, Down and Fermanagh. There are no records from the Republic of Ireland.

***Rheotanytarsus nigricauda* Fittkau, 1960 +**

Known Irish and European distribution - Figures 937 and 938.

Status in Ireland: records from five locations in two HAs (12, 15) in Counties Carlow, Kilkenny, Wexford and Wicklow. There are no records from Northern Ireland.

Rheotanytarsus pellucidus* (Walker, 1848) +

Known Irish and European distribution - Figures 939 and 940.

Status in Ireland: records from 72 locations in 19 HAs (1, 15, 18, 20, 21, 22, 25, 28, 29, 30, 31, 32, 33, 34, 35, 37, 38, 39, 40) in Counties Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Laois, Limerick, Mayo and Sligo.

Rheotanytarsus pentapoda* (Kieffer, 1909) +

Known Irish and European distribution - Figures 941 and 942.

Status in Ireland: records from 135 locations in 27 HAs (1, 3, 4, 7, 10, 11, 12, 15, 18, 20, 21, 22, 23, 25, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Clare, Cork, Derry, Donegal, Galway, Kerry, Kildare, Kilkenny, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford, Wexford and Wicklow.

Comments: *Rheotanytarsus pentapoda* is the most commonly encountered species of the genus found in rivers and streams throughout Ireland. There are a few records of pupal exuviae from mountain lakes that were most likely passively carried with inflowing streams.

Rheotanytarsus photophilus* (Goetghebuer, 1921) +

Known Irish and European distribution - Figures 943 and 944.

Status in Ireland: records from seven locations in five HAs (3, 22, 25, 26, 27) in Counties Clare, Kerry, Offaly, Roscommon and Tyrone.

***Rheotanytarsus reissi* Lehmann, 1970 +**

Known Irish and European distribution - Figures 945 and 946.

Status in Ireland: record from one location in HA 7, County Meath. There are no records from Northern Ireland.

Comments: *Rheotanytarsus reissi* is known only from the western sector of Europe including Ireland, Great Britain, Portugal, Spain, Corsica, France, Italy, Austria, Slovakia, Germany and Poland.

Rheotanytarsus rhenanus* Klink, 1983 +

Known Irish and European distribution - Figures 947 and 948.

Status in Ireland: records from four locations in four HAs (15, 25, 26, 35) in Counties Fermanagh, Galway, Kilkenny and Offaly.

***Rheotanytarsus rioensis* Langton & Armitage, 1995 +**

Known Irish and European distribution - Figures 949 and 950.

Status in Ireland: records from two locations in HA 22, County Kerry. There are no records from Northern Ireland.

Comments: *Rheotanytarsus rioensis* was reported from Ireland by Murray and O'Connor (2012) from specimens that were collected in 1973 but were then unidentifiable since the species had not been described at that time. In Europe, it appears to have a restricted distribution and is thus far only known from Great Britain, Portugal and the Canary Islands.

STEMPELLINA Thienemann & Bause, 1913

Stempellina almi Brundin, 1947 +

Stempellina bausei (Kieffer, 1911) +*

Stempellina larvae are eurytopic and are found in a broad range of aquatic habitats where they construct transportable tubes of fine sand and silt. Five species are known from the western Palaearctic, two of which have been found in Ireland.

***Stempellina almi* Brundin, 1947 +**

Known Irish and European distribution - Figures 951 and 952.

Status in Ireland: records from 11 locations in seven HAs (17, 25, 26, 27, 30, 35, 36) in Counties Cavan, Clare, Leitrim, Roscommon, Sligo and Waterford. There are no records from Northern Ireland.

Stempellina bausei* (Kieffer, 1911) +

Known Irish and European distribution - Figures 953 and 954.

Status in Ireland: records from 114 locations in 24 HAs (4, 6, 7, 9, 10, 15, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39) in Counties Antrim, Cavan, Clare, Cork, Donegal, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Mayo, Monaghan, Offaly, Roscommon, Sligo, Tipperary, Westmeath and Wicklow.

Comments: *Stempellina bausei* is widely distributed in Ireland and has been most commonly found in lake littoral samples and rarely in rivers.

STEMPELLINELLA Brundin, 1947

Stempellinella brevis (Edwards, 1929) +?

Stempellinella edwardsi Spies & Sæther, 2004 +*

Stempellinella reissi Casas & Vilchez-Quero, 1991 +*

Six species of *Stempellinella* are known in the western Palaearctic, three of which are now known from Ireland. Larvae are intolerant of organic pollution and thus are characteristic of clean water springs, streams and lakes.

***Stempellinella brevis* (Edwards, 1929) +?**

Known Irish and European distribution - Figures 955 and 956.

Status in Ireland: records from 127 locations, two on Clare Island and 125 in 23 HAs (1,10, 11, 13, 19, 20, 21, 22, 23, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39) in Counties Cavan, Clare, Cork, Donegal, Galway, Kerry, Leitrim, Mayo, Roscommon, Sligo, Wexford and Wicklow.

Comments: this species is widely distributed in Ireland with records from rivers and clean water mostly in upland unpolluted lakes. Murray *et al*. (2016) indicated that the record by Langton (2002) from County Donegal, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Thus, while it is likely to occur, there are no records of the species to date from Northern Ireland.

Stempellinella edwardsi* Spies & Sæther, 2004 +

Known Irish and European distribution - Figures 957 and 958.

Status in Ireland: records from 135 locations in 24 HAs (1,7, 9, 10, 19, 20, 21, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Cavan, Clare, Cork, Donegal, Dublin, Fermanagh, Galway, Kerry, Leitrim, Limerick, Longford, Mayo, Monaghan, Roscommon, Sligo, Westmeath and Wicklow.

Stempellinella reissi* Casas & Vilchez-Quero, 1991 +

Known Irish and European distribution - Figures 959 and 960.

Status in Ireland: records from nine locations in five HAs (4, 36, 37, 38, 39) in Counties Antrim, Donegal and Fermanagh.

Comments: Irish records of *Stempellinella reissi* are exclusively from lakes in Northern Ireland and in the Republic of Ireland in County Donegal. The species is not recorded in Great Britain and on continental Europe is thus far only known from France and Spain.

TANYTARSUS van der Wulp, 1874

Tanytarsus aberrans Lindeberg, 1970 +

Tanytarsus anderseni Reiss & Fittkau, 1971 *

Tanytarsus bathophilus Kieffer, 1911 +*

Tanytarsus brundini Lindeberg, 1963 +*

Tanytarsus buchonius Reiss & Fittkau, 1971 +*

Tanytarsus chinyensis Goetghebuer, 1934 +*

Tanytarsus curticornis Kieffer, 1911 +*

Tanytarsus debilis (Meigen, 1830) +*

Tanytarsus dibranchius Kieffer, 1926 +

= *separabilis* Brundin, 1947
Tanytarsus ejuncidus (Walker, 1856) +*
Tanytarsus eminulus (Walker, 1856) +*
Tanytarsus excavatus Edwards, 1929 +
Tanytarsus gibbosiceps Kieffer, 1922 +
Tanytarsus glabrescens Edwards, 1929 +*
Tanytarsus gracilentus (Holmgren, 1883) +
Tanytarsus gregarius Kieffer, 1909 +*
Tanytarsus heusdensis Goetghebuer, 1923 +*
Tanytarsus inaequalis Goetghebuer, 1921 +?
Tanytarsus lactescens Edwards, 1929 +
Tanytarsus lestagei Goetghebuer, 1922 +*
= *decipiens* Lindeberg, 1967
= *palmeni* Lindeberg, 1967
Tanytarsus longitarsis Kieffer, 1911 +*
Tanytarsus lugens (Kieffer, 1916) +*
Tanytarsus medius Reiss & Fittkau, 1971 +
Tanytarsus mendax Kieffer, 1925 +*
= *holochlorus* Edwards, 1929
Tanytarsus miriforceps (Kieffer, 1921) *
Tanytarsus nemorosus Edwards, 1929 +
Tanytarsus niger Andersen, 1937 +*
Tanytarsus palettaris Verneaux, 1969 +
Tanytarsus pallidicornis (Walker, 1856) +*
Tanytarsus quadridentatus Brundin, 1947 +
Tanytarsus recurvatus Brundin, 1947 +?
Tanytarsus signatus (van der Wulp, 1859) +
Tanytarsus striatulus Lindeberg, 1976 +
Tanytarsus sylvaticus (van der Wulp, 1859) +*
Tanytarsus telmaticus Lindeberg, 1959 +*
= *simulans* Lindeberg, 1967
Tanytarsus usmaensis Pagast, 1931 +*
Tanytarsus verralli Goetghebuer, 1928 +*

Larvae of the genus *Tanytarsus* are eurytopic, occurring in a variety of habitats in lotic and lentic environments. Some are saline tolerant and live in marine coastal habitats. It is a species-rich genus with some 60 western Palaearctic species known, 38 of which are on record in Ireland.

***Tanytarsus aberrans* Lindeberg, 1970 +**

Known Irish and European distribution - Figures 961 and 962.

Status in Ireland: records from two locations in two HAs (18, 19) in Counties Cork and Tipperary. It is not known from Northern Ireland.
Comments: There are few records of *Tanytarsus aberrans* in Europe. It is thus far unknown in Great Britain but, apart from Ireland, records exist for Norway, Finland, Germany, Poland, Slovakia, Switzerland and the Netherlands.

***Tanytarsus anderseni* Reiss & Fittkau, 1971 ***

Known Irish and European distribution - Figures 963 and 964.
Status in Ireland: record from one location in HA 5, County Antrim.
Comments: this species is known from Great Britain and northern European countries including Finland, Norway and North European Russia. In Ireland, it is known from a single record from Northern Ireland.

Tanytarsus bathophilus* Kieffer, 1911 +

Known Irish and European distribution - Figures 965 and 966.
Status in Ireland: records from 11 locations in eight HAs (1, 3, 7, 21, 22, 25, 26, 35) in Counties Antrim, Derry, Galway, Kerry, Leitrim, Meath and Roscommon.
Comments: this species is widespread in Europe.

Tanytarsus brundini* Lindeberg, 1963 +

Known Irish and European distribution - Figures 967 and 968.
Status in Ireland: records from 152 locations in 25 HAs (1, 3, 4, 7, 9, 12, 15, 18, 20, 21, 22, 25, 26, 27, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Kildare, Kilkenny. Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Waterford, Westmeath, Wexford and Wicklow.
Comments: *Tanytarsus brundini* is widely distributed in Europe southwards from Scandinavian countries to the Iberian Peninsula and eastwards to Bulgaria, Hungary, Poland, Romania and the Czech Republic. It is also known from Iceland.

Tanytarsus buchonius* Reiss & Fittkau, 1971 +

Known Irish and European distribution - Figures 969 and 970.
Status in Ireland: records from 21 locations, three on Clare Island and 18 in 12 HAs (3, 7, 9, 10, 20, 22, 26, 28, 33, 35, 37, 38) in Counties Clare, Cork, Derry, Donegal, Dublin, Kerry, Leitrim, Mayo, Meath and Wicklow.

Tanytarsus chinyensis* Goetghebuer, 1934 +

Known Irish and European distribution - Figures 971 and 972.
Status in Ireland: records from six locations in six HAs (1, 10, 21, 28, 34, 38) in Counties Clare, Derry, Donegal, Kerry and Wicklow.

Tanytarsus curticornis* Kieffer, 1911 +

Known Irish and European distribution - Figures 973 and 974.
Status in Ireland: records from 18 locations in nine HAs (7, 20, 22, 25, 26, 31, 36, 38, 39) in Counties Cavan, Clare, Cork, Donegal, Fermanagh, Galway, Kerry, Leitrim, Longford, Meath, Roscommon and Westmeath.

Tanytarsus debilis* (Meigen, 1830) +

Known Irish and European distribution - Figures 975 and 976.

Status in Ireland: records from 15 locations in 11 HAs (5, 6, 7, 13, 16, 25, 30, 31, 34, 35, 36) in Counties Cavan, Clare, Down, Mayo, Monaghan, Sligo, Waterford, Westmeath and Wexford.

***Tanytarsus dibranchius* Kieffer, 1926 +**

[= *separabilis* Brundin, 1947]

Known Irish and European distribution - Figures 977 and 978.

Status in Ireland: records from three locations in three HAs (15, 22, 26) in Counties Kerry, Roscommon and Tipperary. There are no records from Northern Ireland.

Comments: in Europe, *Tanytarsus dibranchius* is recorded from only seven European countries to date including Ireland, Sweden, Finland, the Netherlands, Germany, the Czech Republic and Poland.

Tanytarsus ejuncidus* (Walker, 1856) +

Known Irish and European distribution - Figures 979 and 980.

Status in Ireland: records from 26 locations in 12 HAs (3, 4, 7, $12, 15, 26, 30, 32, 35, 36, 38, 39) in Counties Antrim, Derry, Donegal, Fermanagh, Galway, Kilkenny, Laois, Leitrim, Mayo, Meath, Sligo, Tipperary, Tyrone and $Wexford. [$Murray, 2017a].

Tanytarsus eminulus* (Walker, 1856) +

Known Irish and European distribution - Figures 981 and 982.

Status in Ireland: records from 118 locations in 27 HAs (1, 2, 3, 4, 6, 7, 10, 12, 15, 18, 20, 21, 22, 25, 26, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Carlow, Cavan, Clare, Cork, Derry, Donegal, Down, Fermanagh, Galway, Kerry, Kildare, Kilkenny. Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Waterford and Wicklow.

***Tanytarsus excavatus* Edwards, 1929 +**

Known Irish and European distribution - Figures 983 and 984.

Status in Ireland: records from five locations in three HAs (27, 30, 36) in Counties Clare and Galway. There are no records from Northern Ireland.

***Tanytarsus gibbosiceps* Kieffer, 1922 +**

Known Irish and European distribution - Figures 985 and 986.

Status in Ireland: record from one location in HA 22, County Kerry. There are no records from Northern Ireland.

Tanytarsus glabrescens* Edwards, 1929 +

Known Irish and European distribution - Figures 987 and 988.

Status in Ireland: records from 14 locations in eight HAs (7, 19, 21, 25, 27, 30, 36, 40) in Counties Cavan, Clare, Cork, Derry, Donegal, Galway, Kerry, Offaly and Westmeath.

***Tanytarsus gracilentus* (Holmgren, 1883) +**

Known Irish and European distribution - Figures 989 and 990.

Status in Ireland: records from two locations, one on Clare Island and one in HA 34, County Mayo. There are no records from Northern Ireland.

Tanytarsus gregarius* Kieffer, 1909 +

Known Irish and European distribution - Figures 991 and 992.

Status in Ireland: records from 74 locations, two each on Clare Island and Rathlin Island and 70 in 23 HAs (1, 3, 5, 6, 10, 13, 17, 18, 20, 21, 22, 24, 25, 26, 27, 30, 31, 32, 34, 35, 36, 37, 38) in Counties Antrim, Cavan, Clare, Cork, Derry, Donegal, Fermanagh, Galway, Kerry, Limerick, Mayo, Monaghan, Roscommon, Sligo, Tipperary, Waterford, Westmeath, Wexford and Wicklow.

Tanytarsus heusdensis* Goetghebuer, 1923 +

Known Irish and European distribution - Figures 993 and 994.

Status in Ireland: records from 53 locations in 19 HAs (6, 7, 8, 12, 15, 18, 20, 25, 26, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Carlow, Cavan, Cork, Donegal, Fermanagh, Galway, Kilkenny, Laois, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Wexford and Wicklow.

***Tanytarsus inaequalis* Goetghebuer, 1921 +?**

Known Irish and European distribution - Figures 995 and 996.

Status in Ireland: records from ten locations in eight HAs (18, 21, 23, 28, 29, 30, 31, 38) in Counties Clare, [$]Cork, Donegal, Galway, Kerry and Tipperary. [[$]Murray and Ashe, 2016b].

Comments: there are no records from Northern Ireland. Murray *et al*. (2016) indicated that the record by Langton (2002) from County Donegal, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013).

***Tanytarsus lactescens* Edwards, 1929 +**

Known Irish and European distribution - Figures 997 and 998.

Status in Ireland: records from five locations in four HAs (25, 26, 27, 32) in Counties Clare, Mayo, Roscommon and Westmeath.

Tanytarsus lestagei* Goetghebuer, 1922 +

[= *decipiens* Lindeberg, 1967; *palmeni* Lindeberg, 1967]

Known Irish and European distribution - Figures 999 and 1000.

Status in Ireland: records from 47 locations, one on Clare Island and 46 in 24 HAs (1, 3, 4, 5, 9, 10, 15, 18, 19, [$]21, 22, 25, 26, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40) in Counties Antrim, Clare, Cork, Derry, Donegal, Dublin, Fermanagh, Galway, Kerry, Mayo, Offaly, Roscommon, Sligo, Tipperary, Tyrone, Westmeath and Wicklow. [[$]Murray and Ashe, 2017].

Tanytarsus longitarsis* Kieffer, 1911 +

Known Irish and European distribution - Figures 1001 and 1002.

Status in Ireland: records from four locations in four HAs (1, 3, 21, 37) in Counties Armagh, Derry, Donegal and Kerry.

Tanytarsus lugens* (Kieffer, 1916) +

Known Irish and European distribution - Figures 1003 and 1004.

Status in Ireland: records from three locations in three HAs (3, 10, 38) in Counties Antrim, Donegal and Wicklow.

***Tanytarsus medius* Reiss & Fittkau, 1971 +**

Known Irish and European distribution - Figures 1005 and 1006.

Status in Ireland: records from 14 locations in seven HAs (7, 15, 19, 22, 26, 32, 35) in Counties Cork, Kerry Kilkenny, Mayo, Meath, Sligo and Westmeath. There are no records from Northern Ireland.

Tanytarsus mendax* Kieffer, 1925 +

[= *holochlorus* Edwards, 1929]

Known Irish and European distribution - Figures 1007 and 1008.

Status in Ireland: records from 21 locations, three on Rathlin Island and 18 in 12 HAs (3, 5, 6, 17, 20, $21, 22, 25, 26, 27, 30, 36) in Counties Antrim, Cavan, Clare, Cork, Derry, Down, Fermanagh, Galway, Kerry, Leitrim, Louth, Monaghan and Waterford. [$Murray and Ashe, 2017].

***Tanytarsus miriforceps* (Kieffer, 1921) ***

Known Irish and European distribution - Figures 1009 and 1010.

Status in Ireland: record from HA 36 in County Fermanagh in Northern Ireland. There are no records from the Republic of Ireland.

***Tanytarsus nemorosus* Edwards, 1929 +**

Known Irish and European distribution - Figures 1011 and 1012.

Status in Ireland: one record from a single location in HA 27 in County Clare. There are no records from Northern Ireland.

Tanytarsus niger* Andersen, 1937 +

Known Irish and European distribution - Figures 1013 and 1014.

Status in Ireland: records from five locations in five HAs (1, 3, 22, 27, 29) in Counties Clare, Derry and Kerry.

***Tanytarsus palettaris* Verneaux, 1969 +**

Known Irish and European distribution - Figures 1015 and 1016.

Status in Ireland: records from eight locations in five HAs (3, 8, $12, 15, 30, 34) in Counties Derry, Galway, Kerry, Laois, Meath, Tipperary and $Wexford. There are no records from Northern Ireland. [$Murray, 2017a].

Tanytarsus pallidicornis* (Walker, 1856) +

Known Irish and European distribution - Figures 1017 and 1018.

Status in Ireland: records from 65 locations, one on Clare Island and 64 in 21 HAs (1, 2, 3, 4, 6, 7, 9, 12, 15, 16, 18, 20, 21, 22, 25, 26, 32, 34, 36, 37, 39) in Counties

Antrim, Cavan, Cork, Derry, Donegal, Kerry, Kildare, Kilkenny, Laois, Limerick, Mayo, Meath, Offaly, Roscommon, Sligo, Tipperary, Waterford and Wicklow.

***Tanytarsus quadridentatus* Brundin, 1947 +**

Known Irish and European distribution - Figures 1019 and 1020.

Status in Ireland: records from four locations in two HAs (22, 27) in Counties Clare and Kerry.

***Tanytarsus recurvatus* Brundin, 1947 +?**

Known Irish and European distribution - Figures 1021 and 1022.

Status in Ireland: records from 11 locations in seven HAs (21, 22, 27, 30, 31, 38, 40) in Counties Clare, Donegal, Galway and Kerry.

Comments: Murray *et al*. (2016) indicated that the record by Langton (2002) from County Donegal, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Thus, while it is likely to occur, there are no records of the species to date from Northern Ireland.

***Tanytarsus signatus* (van der Wulp, 1859) +**

Known Irish and European distribution - Figures 1023 and 1024.

Status in Ireland: records from 29 locations, five on Clare Island and 24 in 11 HAs (1, 9, 21, 22, 26, 27, 31, 34, 36, 38, 39) in Counties Clare, Cork, Donegal, Galway, Kerry, Mayo, Roscommon, Tyrone, Westmeath and Wicklow.

***Tanytarsus striatulus* Lindeberg, 1976 +**

Known Irish and European distribution - Figures 1025 and 1026.

Status in Ireland: records from eight locations in five HAs (7, 21, 27, 33, 38) and Clare Island in Counties Clare, Donegal, Kerry, Mayo and Meath.

Tanytarsus sylvaticus* (van der Wulp, 1859) +

Known Irish and European distribution - Figures 1027 and 1028.

Status in Ireland: records from five locations in four HAs (3, 9, 26, 36) in Counties Cavan, Derry, Kildare and Monaghan.

Tanytarsus telmaticus* Lindeberg, 1959 +

[= *simulans* Lindeberg, 1967]

Known Irish and European distribution - Figures 1029 and 1030.

Status in Ireland: records from 28 locations, five on Rathlin Island and 23 in 13 HAs (3, 4, 18, $21, 26, 27, 29, 32, 33, 35, 36, 37, 38) in Counties Antrim, Cavan, Clare, $Cork, Derry, Donegal, Fermanagh, Galway, Leitrim, Mayo and Tipperary. [$Murray and Ashe, 2017].

Tanytarsus usmaensis* Pagast, 1931 +

Known Irish and European distribution - Figures 1031 and 1032.

Status in Ireland: records from 28 locations, one on Rathlin Island and 27 in 12 HAs (1, 3, 7, $9, 25, 26, 27, 32, 36, 37, 38, 40) and Rathlin Island in Counties Antrim (including Rathlin Island), Armagh, Cavan, Clare, Derry, Donegal, Fermanagh, $Kildare, Mayo, Meath, Offaly and Westmeath. [$Murray and Ashe, 2017].

Tanytarsus verralli Goetghebuer, 1928 +*

Known Irish and European distribution - Figures 1033 and 1034.

Status in Ireland: records from 21 locations in eight HAs (3, 17, 25, 27, 29, 30, 36, 38) in Counties Antrim, Armagh, Clare, Derry, Donegal, Fermanagh, Galway, Offaly and Waterford.

VIRGATANYTARSUS Pinder, 1982

Virgatanytarsus arduennensis (Goetghebuer, 1922) +*

Virgatanytarsus triangularis (Goetghebuer, 1928) +?

Virgatanytarsus larvae are commonly found in rivers and streams and occasionally in the littoral zone of lakes. Four species are on record from western Europe, two of which are known from Ireland.

Virgatanytarsus arduennensis (Goetghebuer, 1922) +*

Known Irish and European distribution - Figures 1035 and 1036.

Status in Ireland: records from 13 locations in seven HAs (3, 7, 12, 25, 26, 31, 32) in Counties Carlow, Derry, Galway, Mayo, Meath, Roscommon and Westmeath.

Virgatanytarsus triangularis (Goetghebuer, 1928) +?

Known Irish and European distribution - Figures 1037 and 1038.

Status in Ireland: records from 20 locations in ten HAs (7, 8, 16, 22, 25, 27, 29, 30, 32, 38) in Counties Cavan, Clare, Donegal, Galway, Kerry, Mayo, Meath, Tipperary and Westmeath.

Comments: Murray *et al*. (2016) indicated that the records by Langton (2002) from Counties Cavan and Donegal, Republic of Ireland, were erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Thus, while it is likely to occur, there are no records of the species to date from Northern Ireland.

ZAVRELIA Kieffer, Thienemann & Bause, 1913

Zavrelia pentatoma Kieffer & Bause, 1913 +?

While many *Zavrelia* larvae are found in rivers and streams, those of *Z. pentatoma* prefer clean, unpolluted standing humic waters.

Zavrelia pentatoma Kieffer & Bause, 1913 +?

Known Irish and European distribution - Figures 1039 and 1040.

Status in Ireland: records from five locations, one on Clare Island and four in three HAs (29, 32, 37) in Counties Donegal, Galway and Mayo.

Comments: Murray *et al*. (2016) indicated that the record by Langton (2002) from County Donegal, Republic of Ireland, was erroneously assigned to Northern Ireland in Fauna Europaea (Spies and Sæther, 2013). Although it is likely, there are no records of the species to date from Northern Ireland. Existing Irish records are confined to the west and north-west of the island. The species is widely distributed in central and

northern Europe but there are no records from the Iberian Peninsula, the Balkans and parts of eastern Europe.

The maps

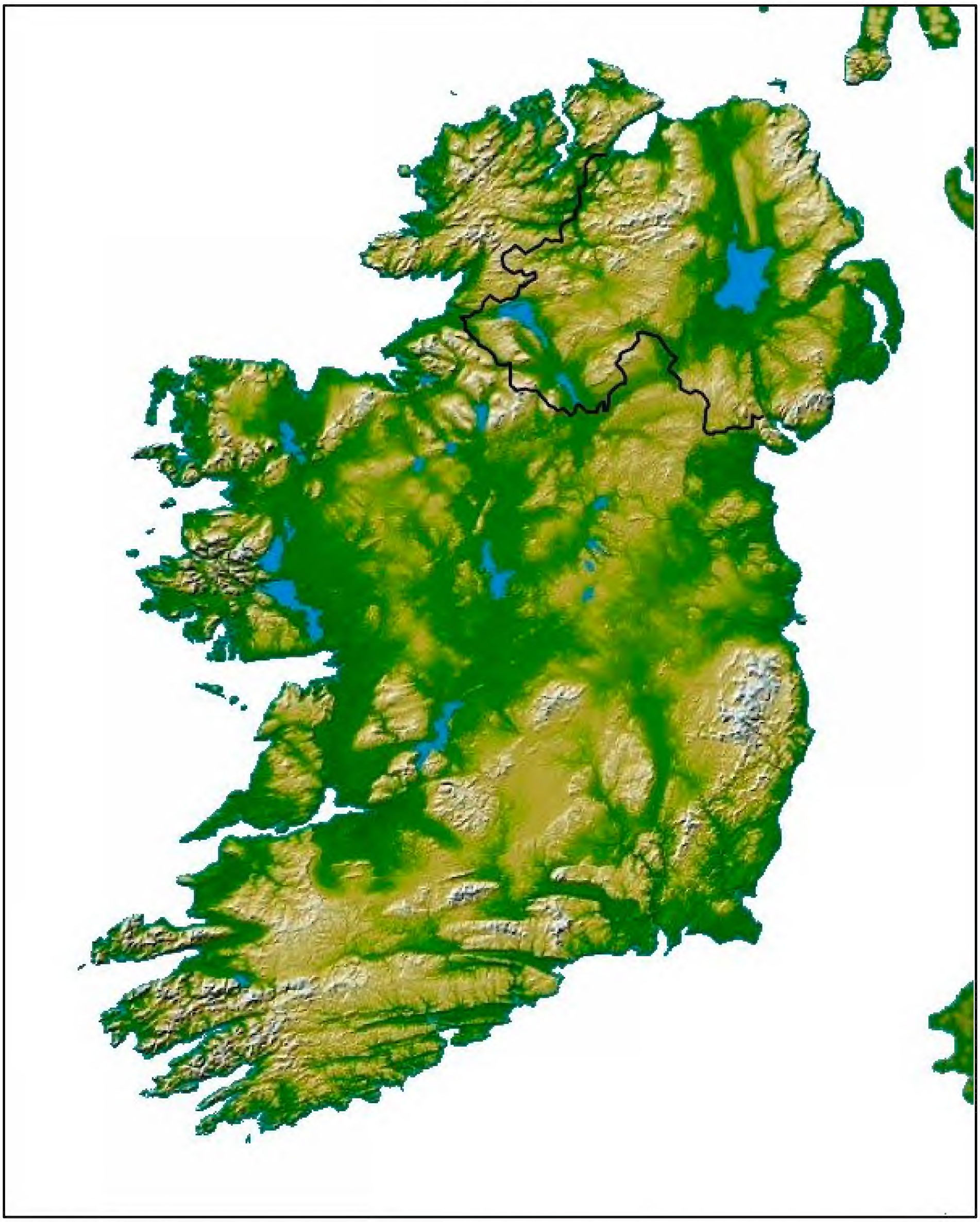
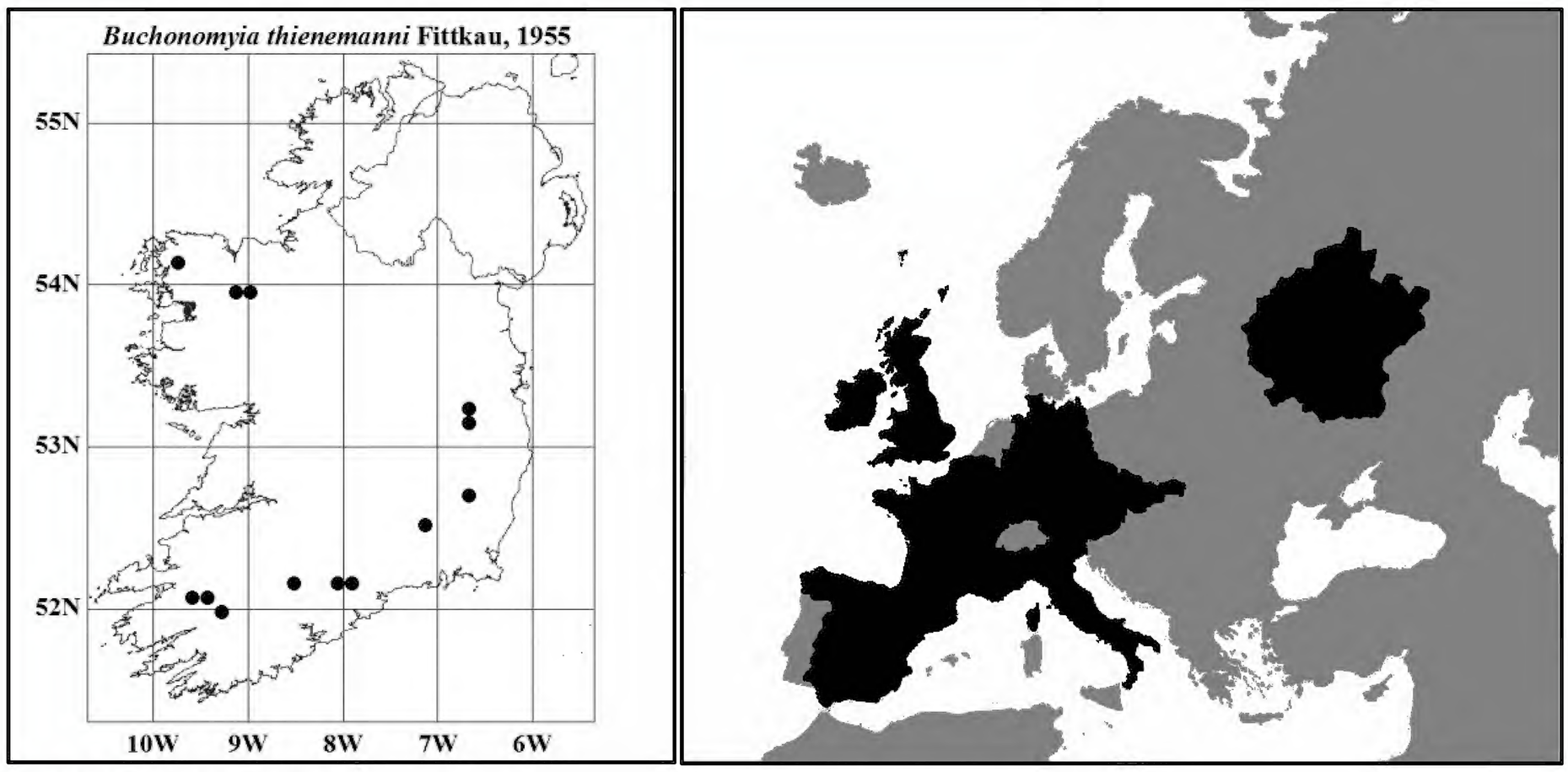
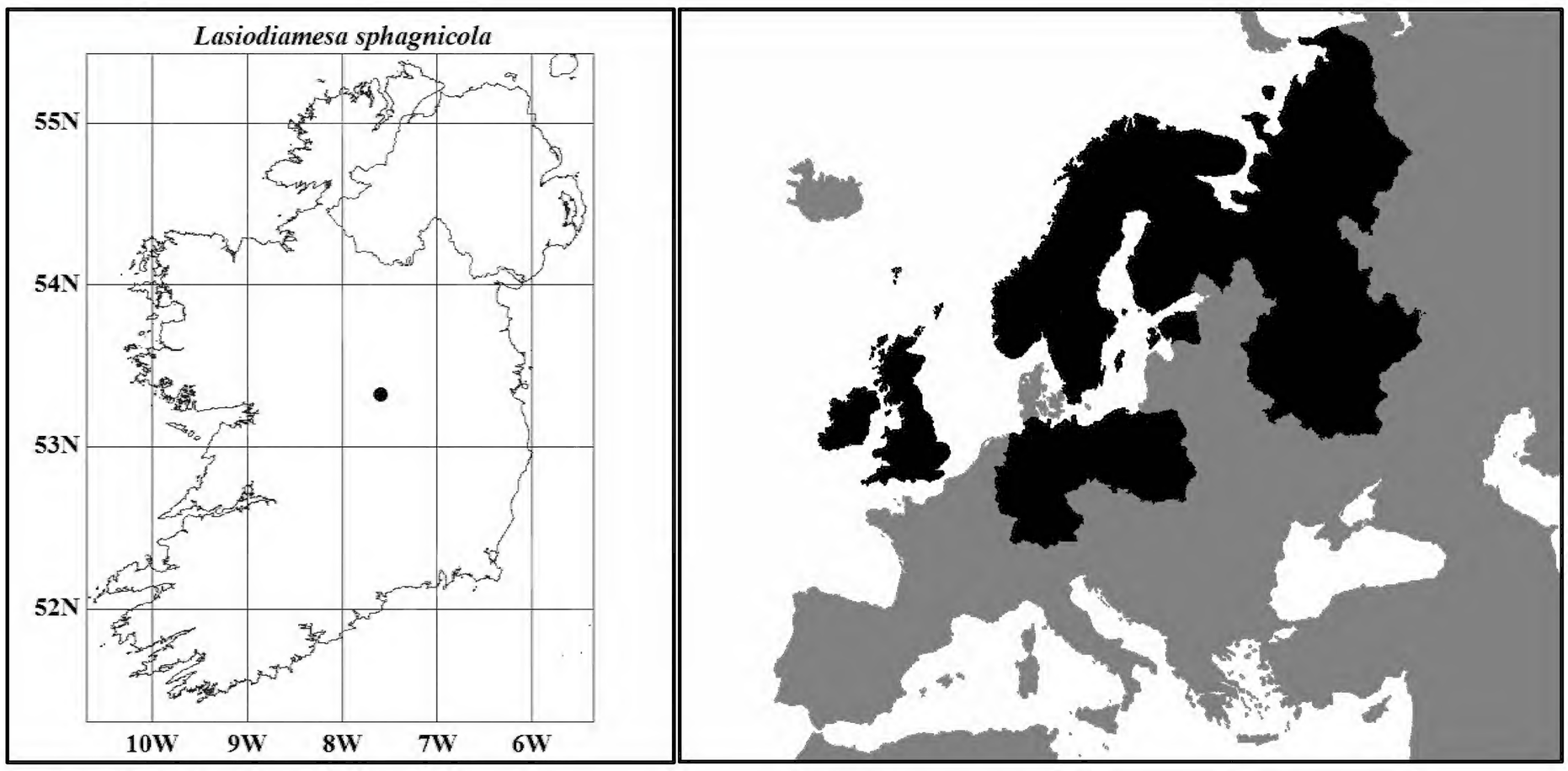


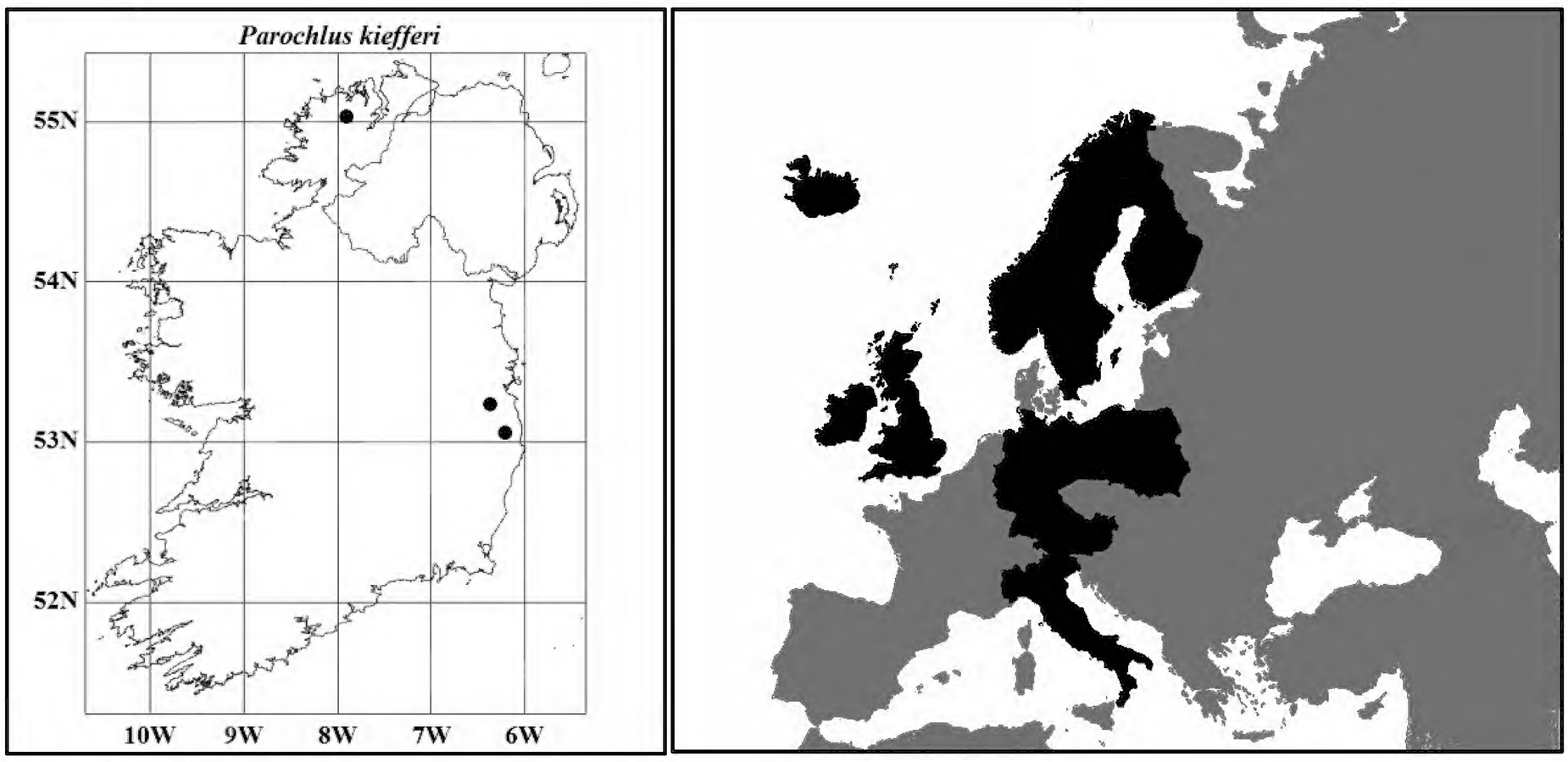
PLATE 20. The topography of Ireland (© NASA). The border between Northern Ireland and the Republic of Ireland is indicated by a dark line.



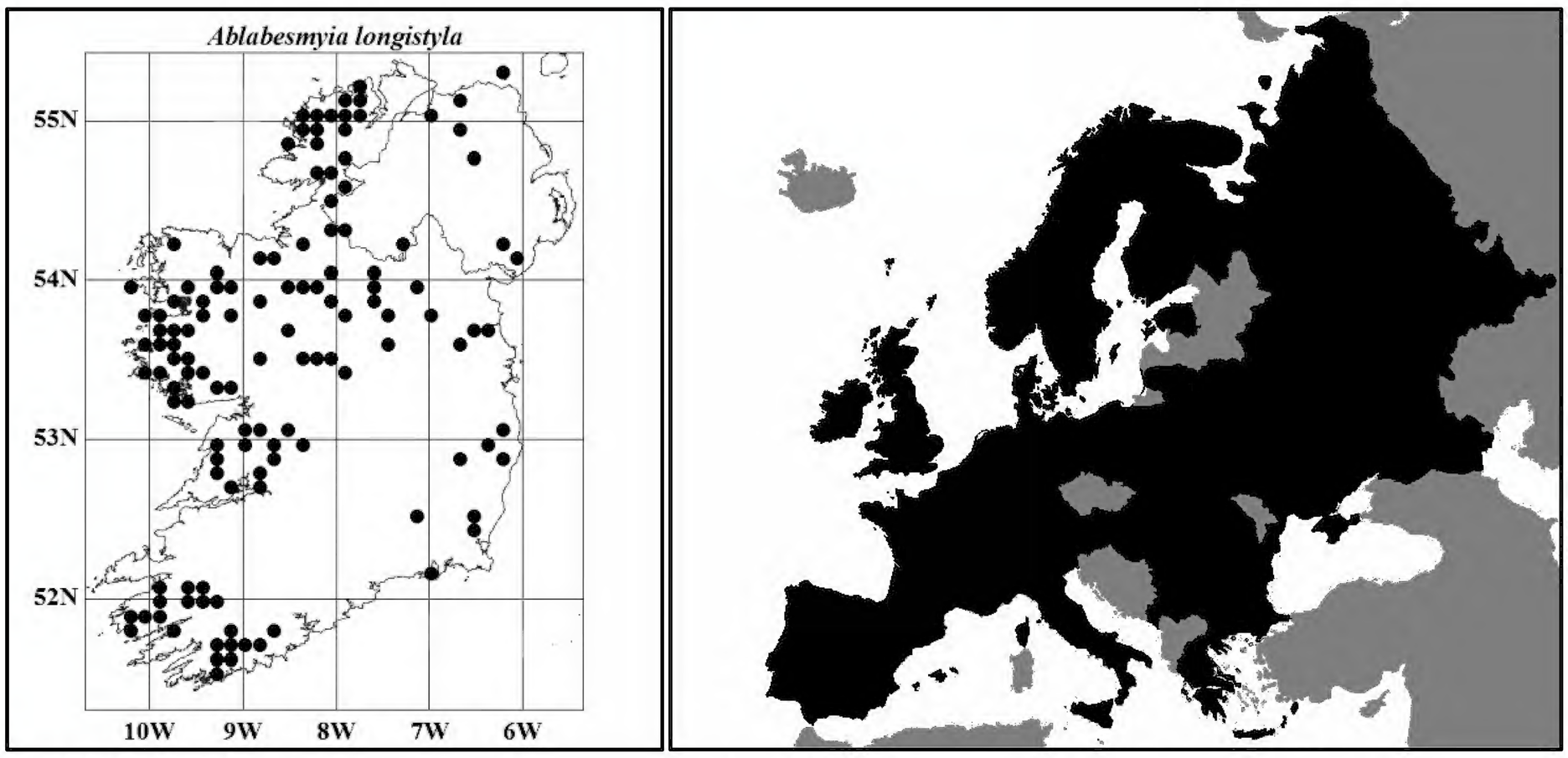
FIGURES 1-2. *Buchonomyia thienemanni* Fittkau, 1955.



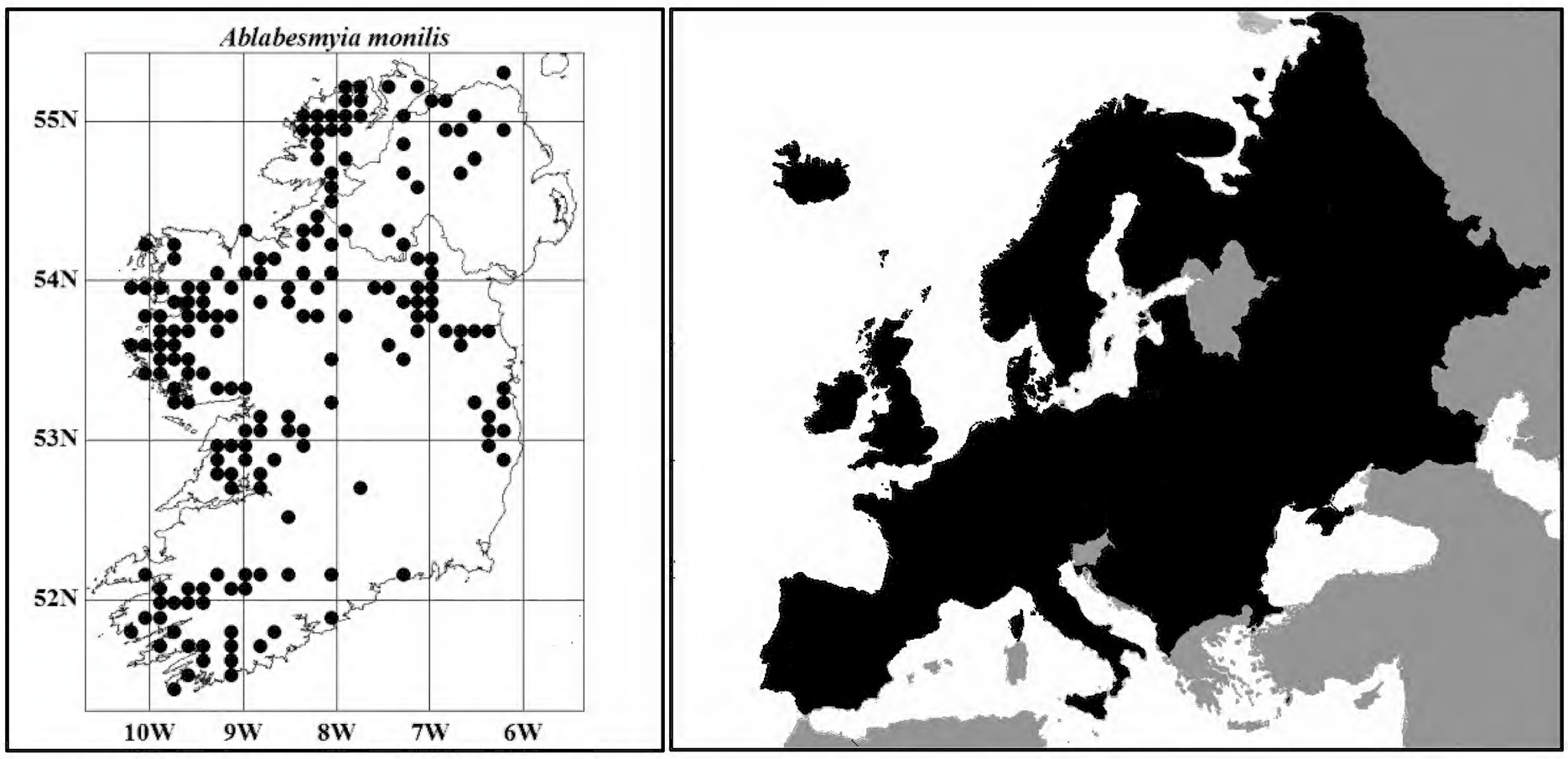
FIGURES 3-4. *Lasiodiamesa sphagnicola* (Kieffer, 1925).



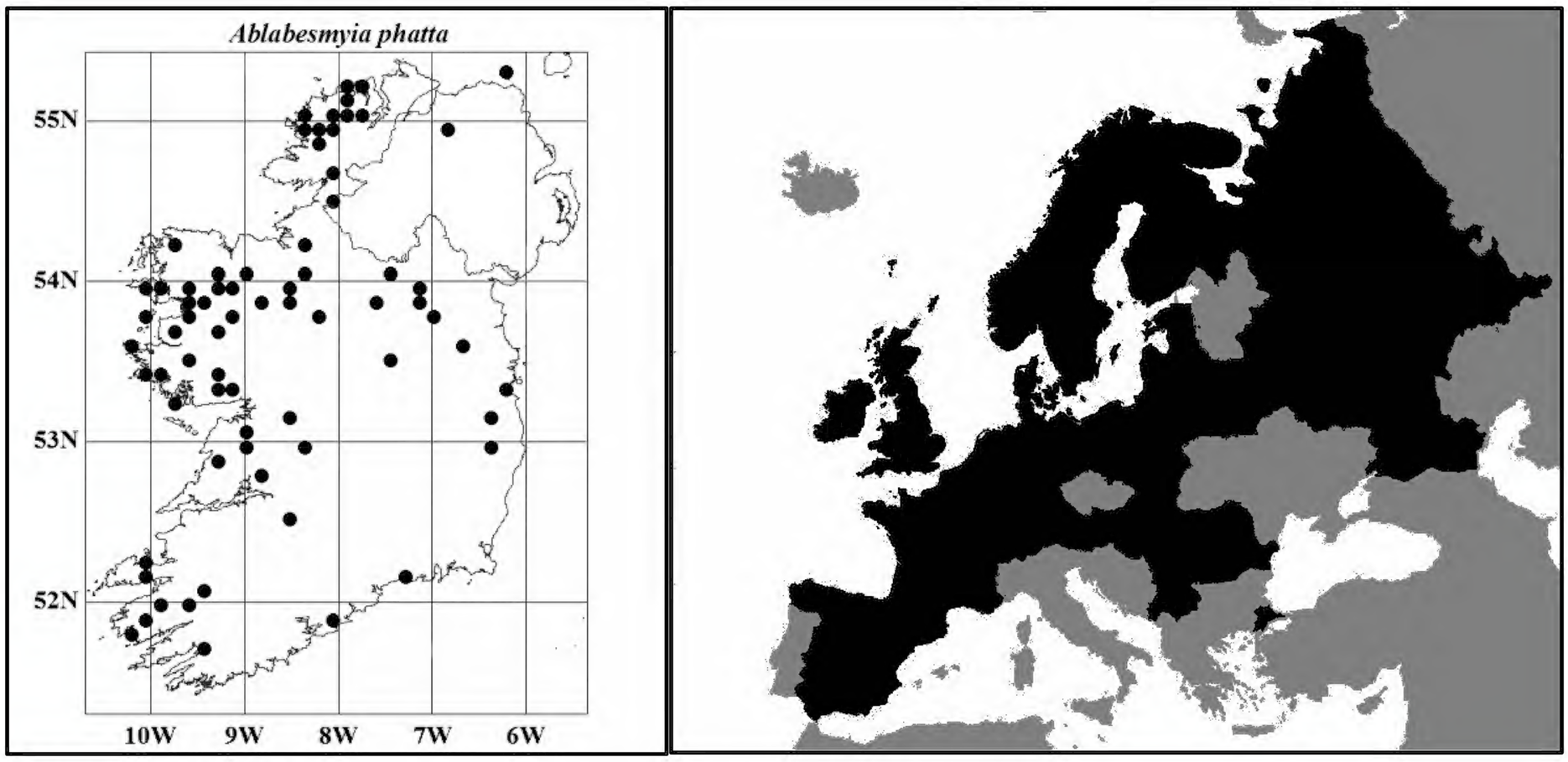
FIGURES 5-6. *Parochlus kiefferi* (Garrett, 1925).



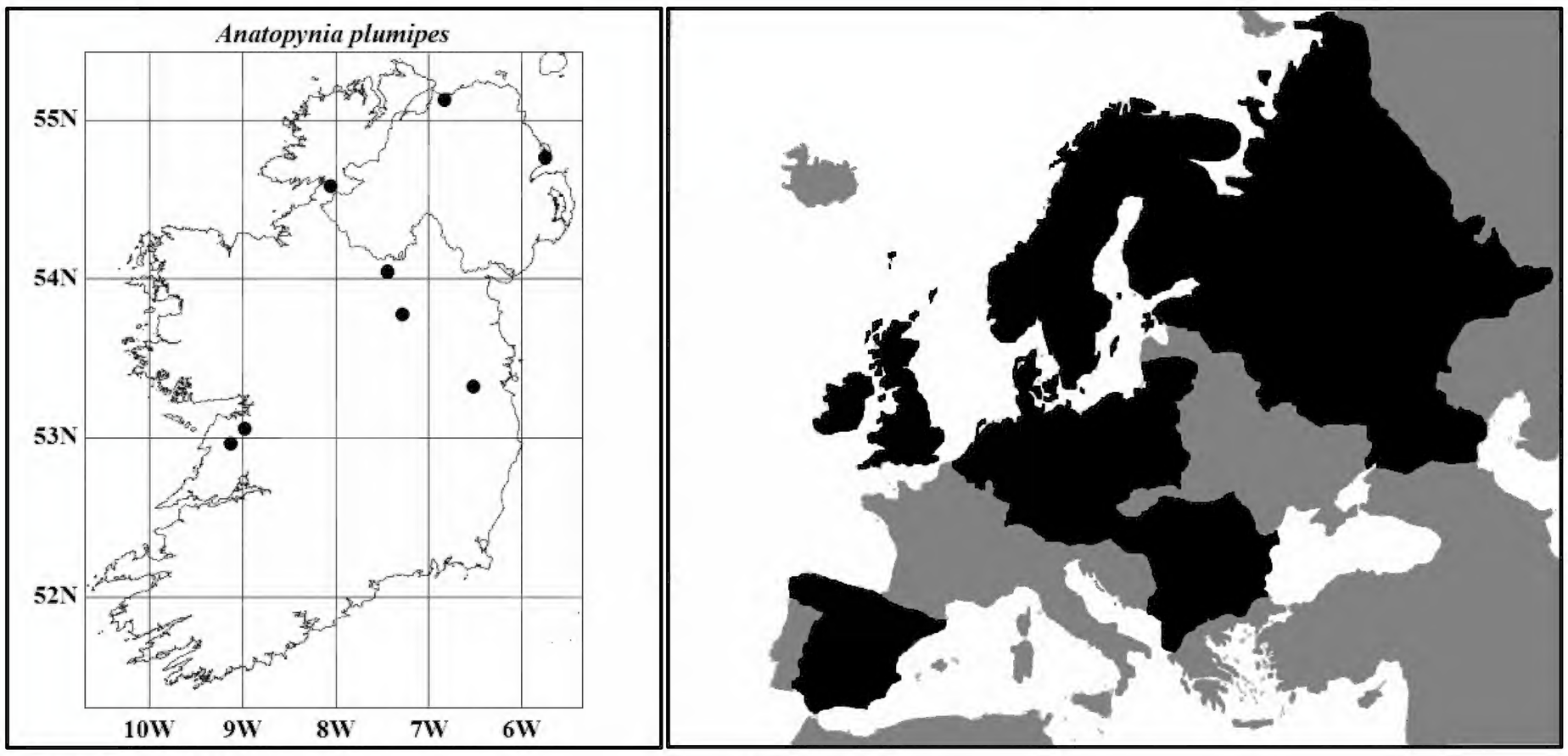
FIGURES 7-8. *Ablabesmyia longistyla* Fittkau, 1962.



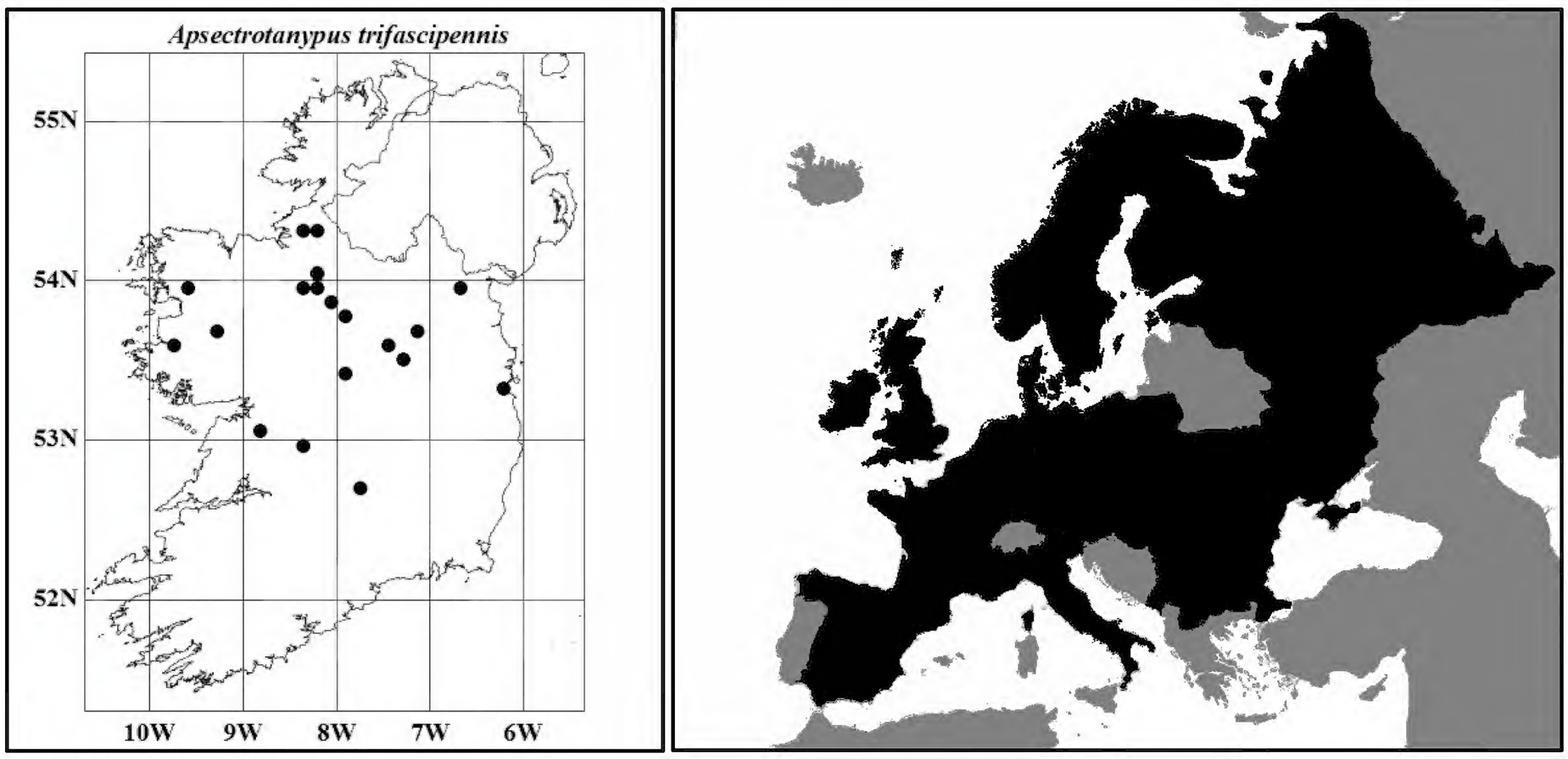
FIGURES 9-10. *Ablabesmyia monilis* (Linnaeus, 1758).



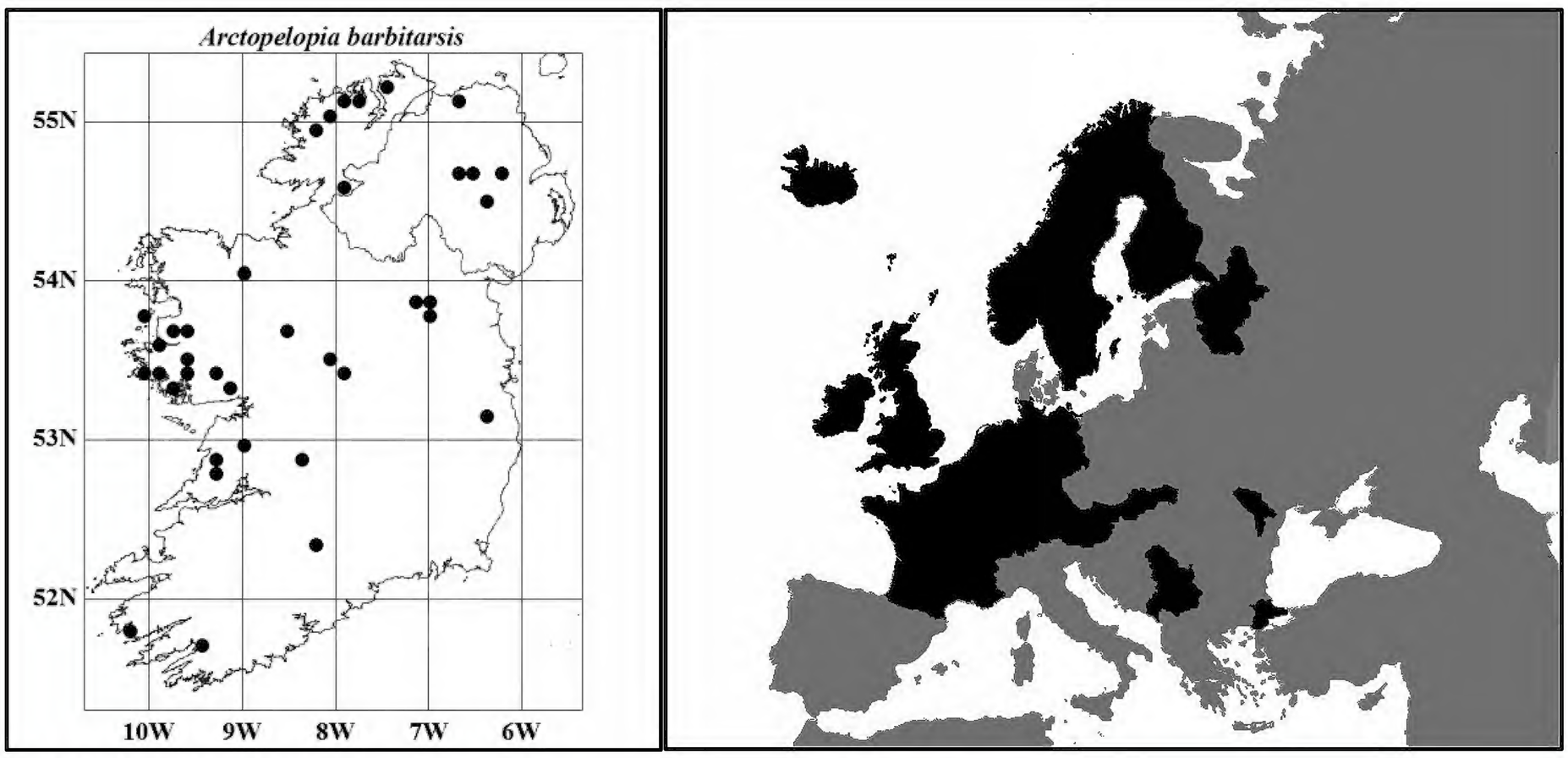
FIGURES 11-12. *Ablabesmyia phatta* (Egger, 1864).



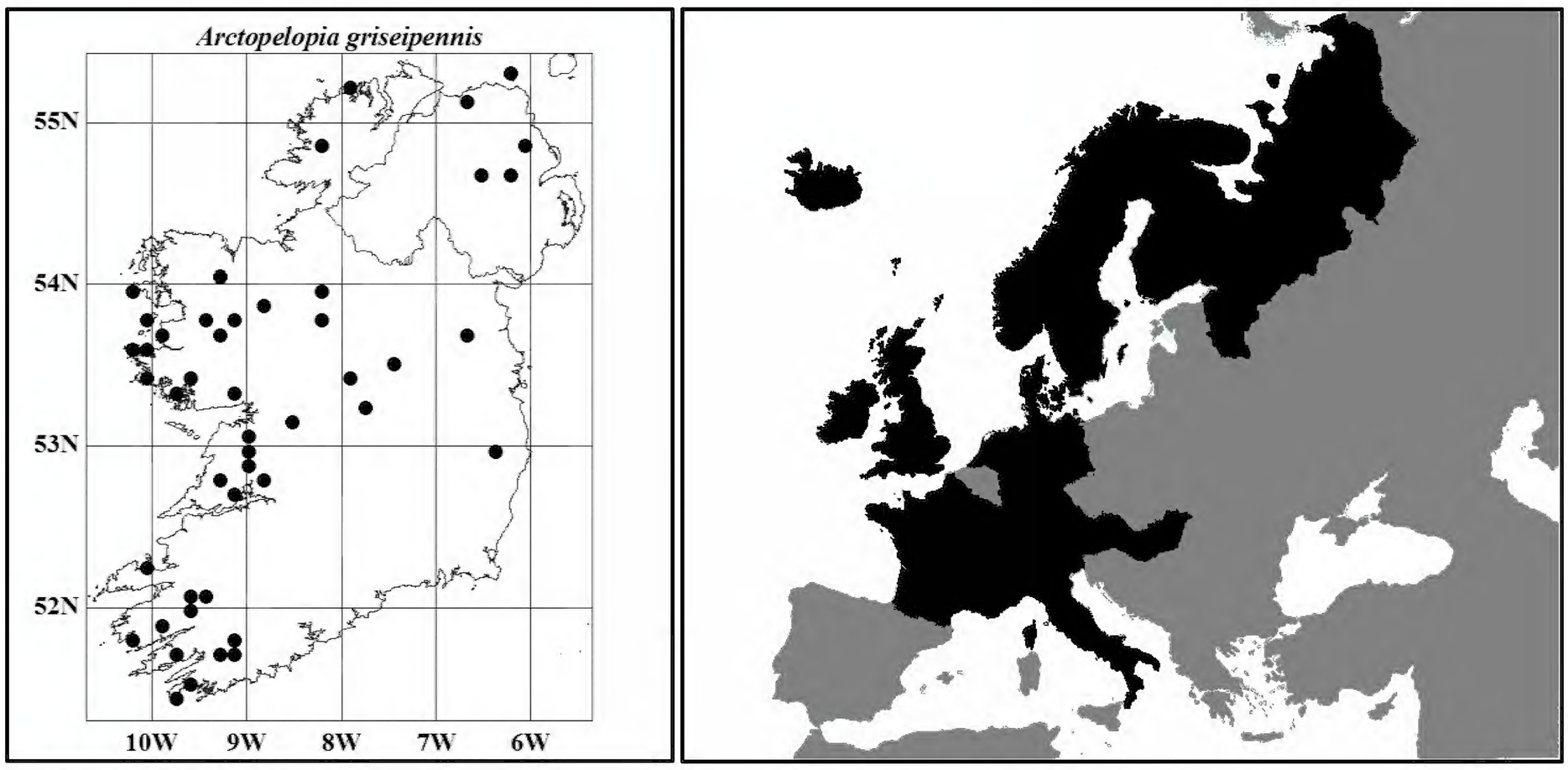
FIGURES 13-14. *Anatopynia plumipes* (Fries, 1823).



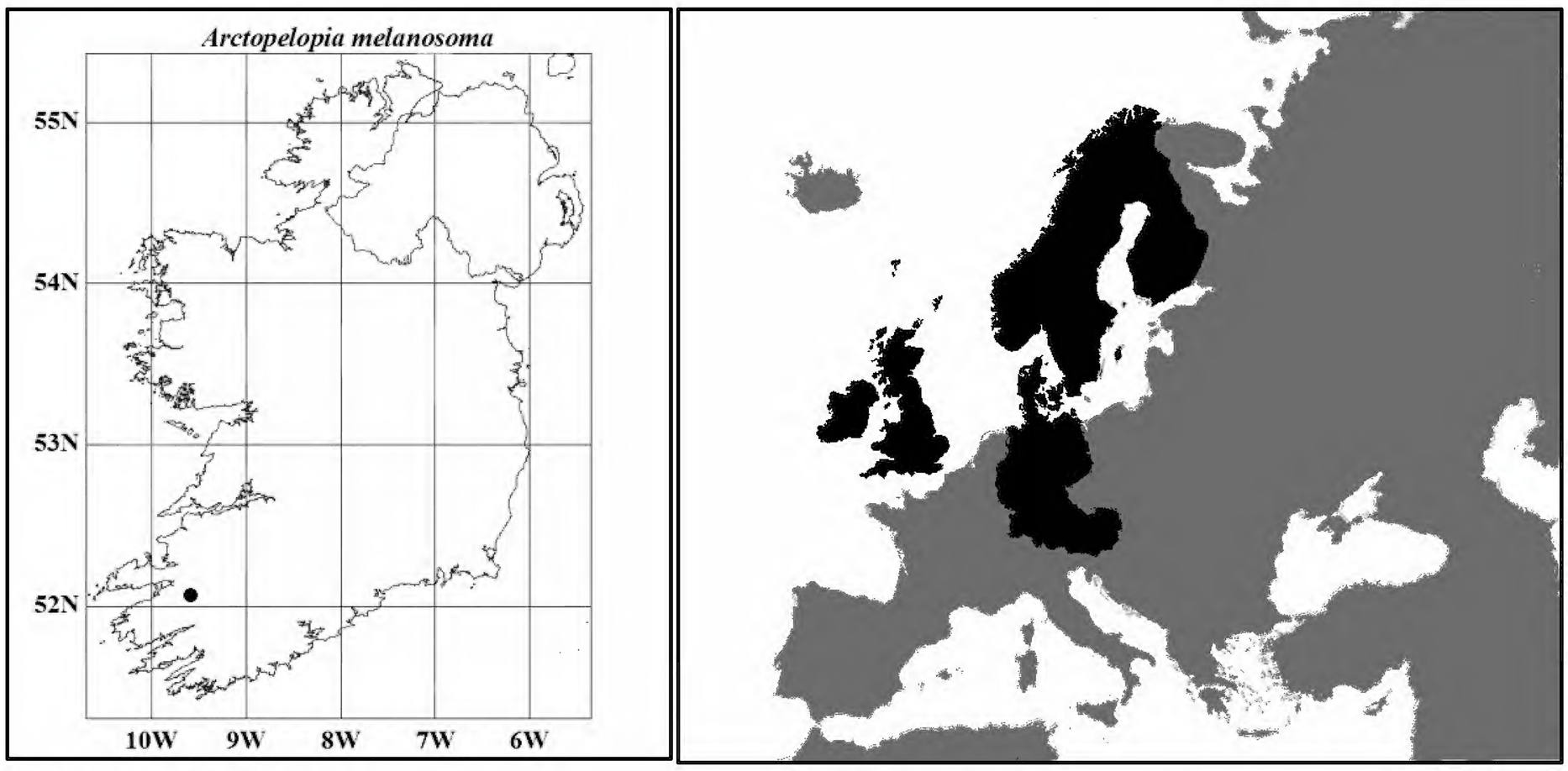
FIGURES 15-16. *Apsectrotanypus trifascipennis* (Zetterstedt, 1838).



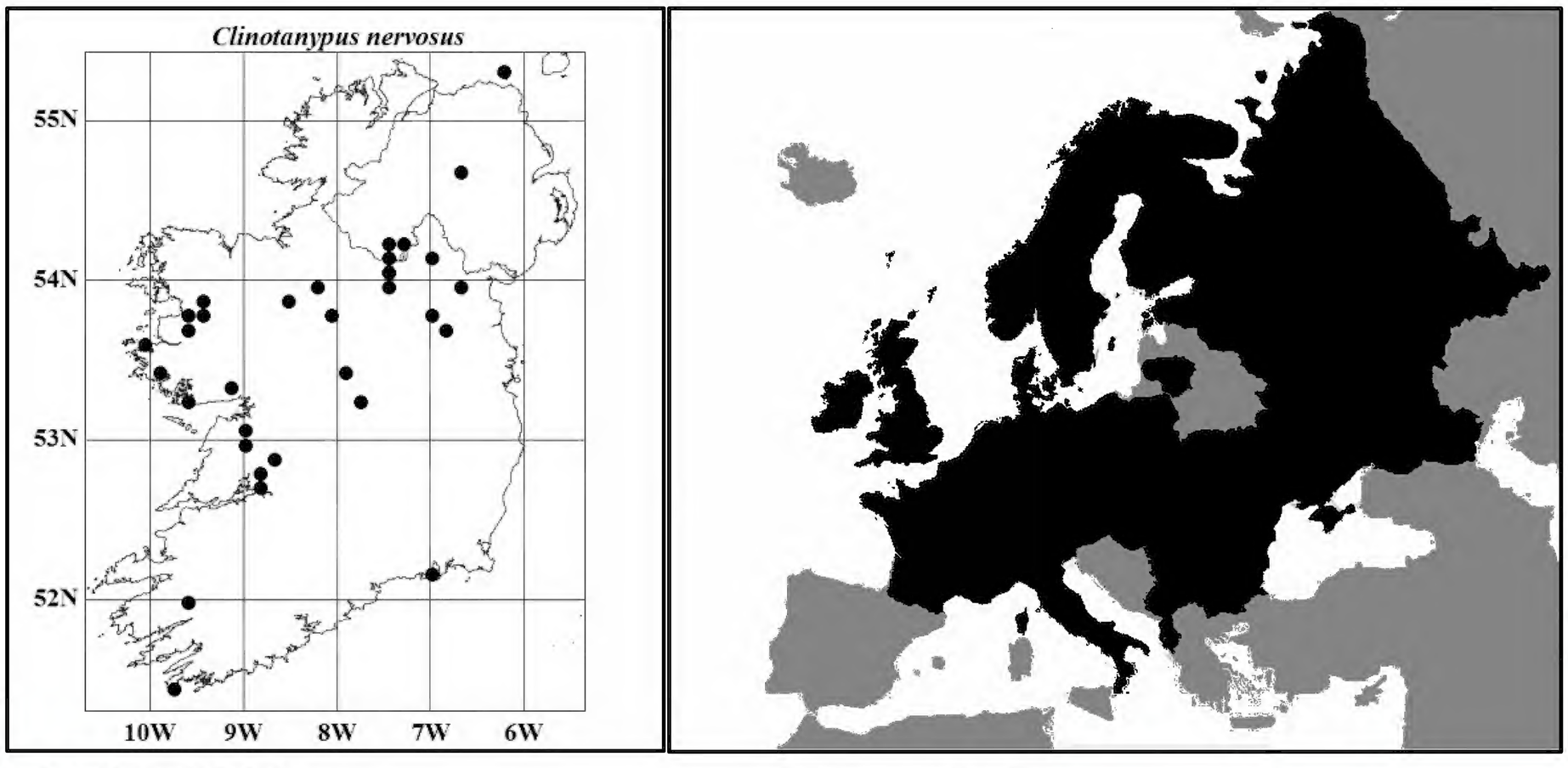
FIGURES 17-18. *Arctopelopia barbitarsis* (Zetterstedt, 1850).



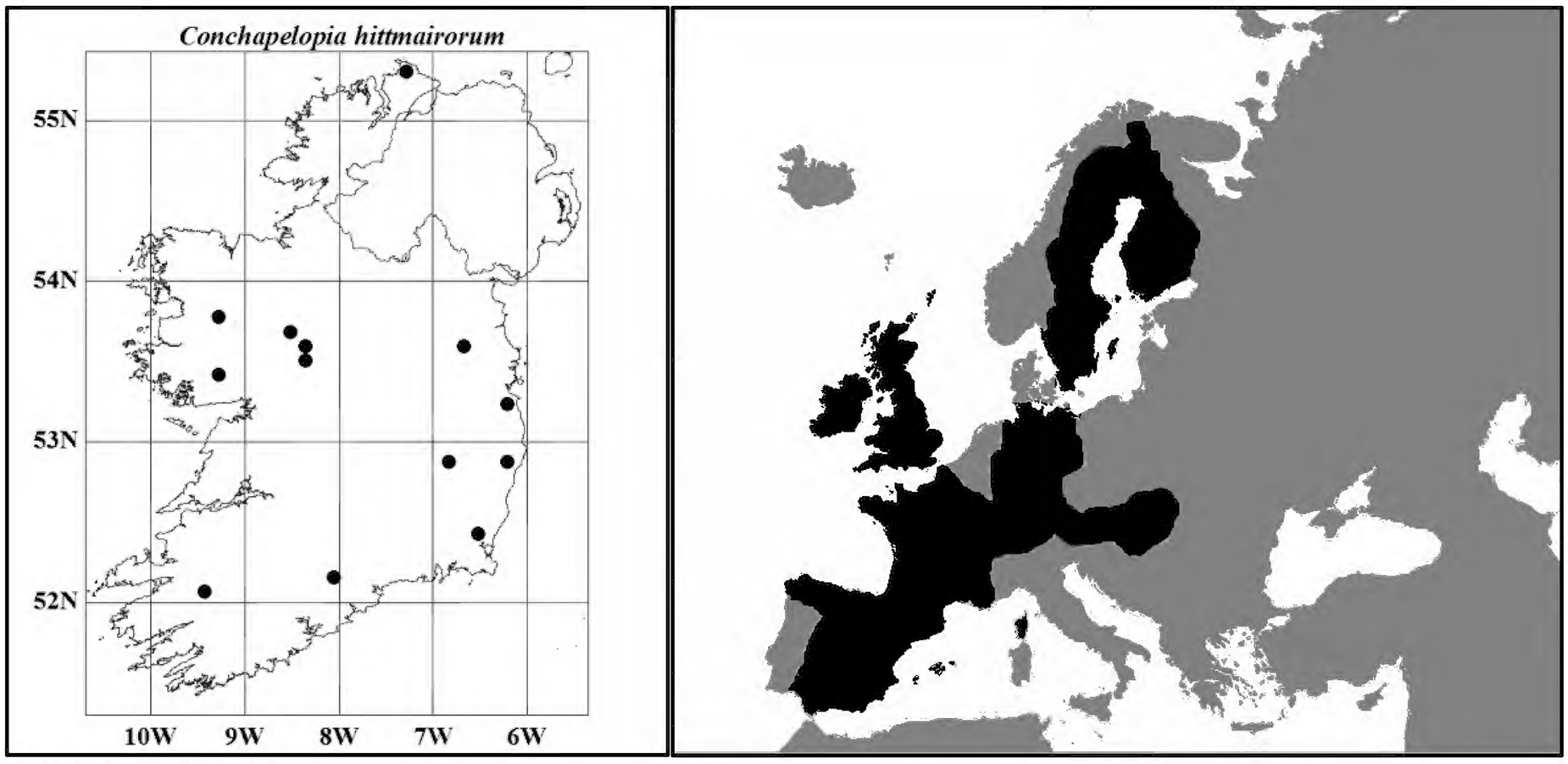
FIGURES 19-20. *Arctopelopia griseipennis* (van der Wulp, 1859).



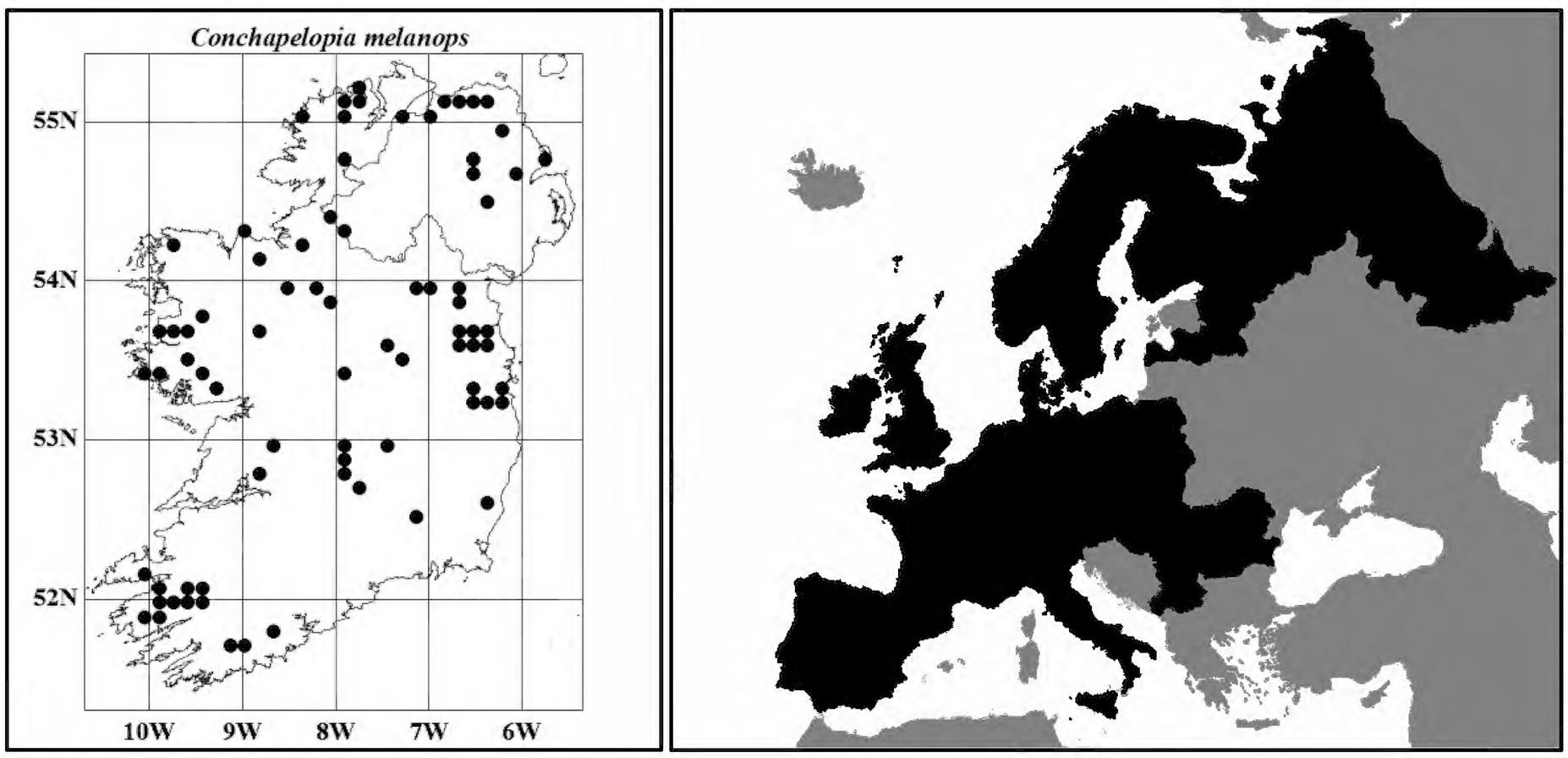
FIGURES 21-22. *Arctopelopia melanosoma* (Goetghebuer, 1933).



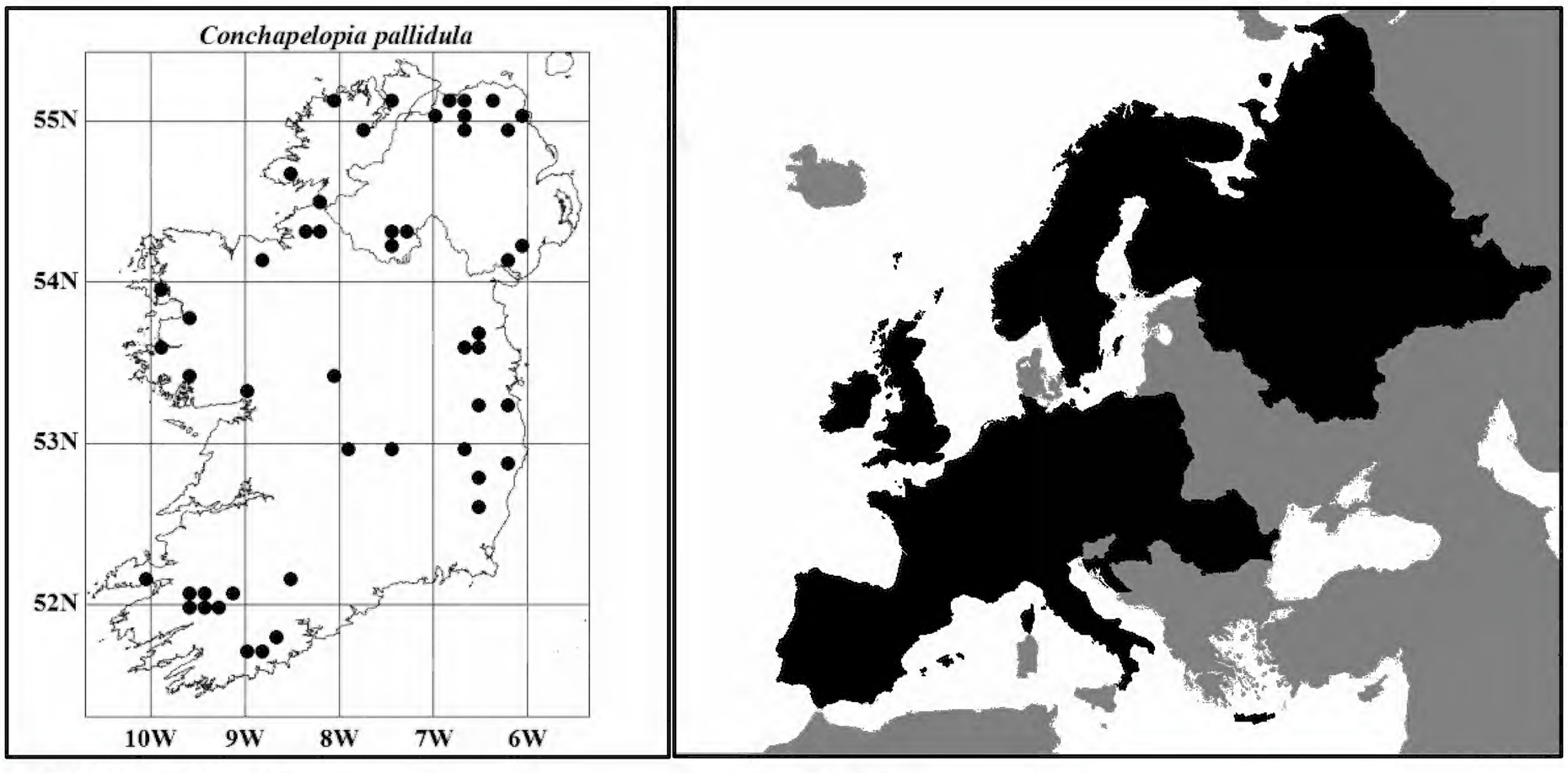
FIGURES 23-24. *Clinotanypus nervosus* (Meigen, 1818).



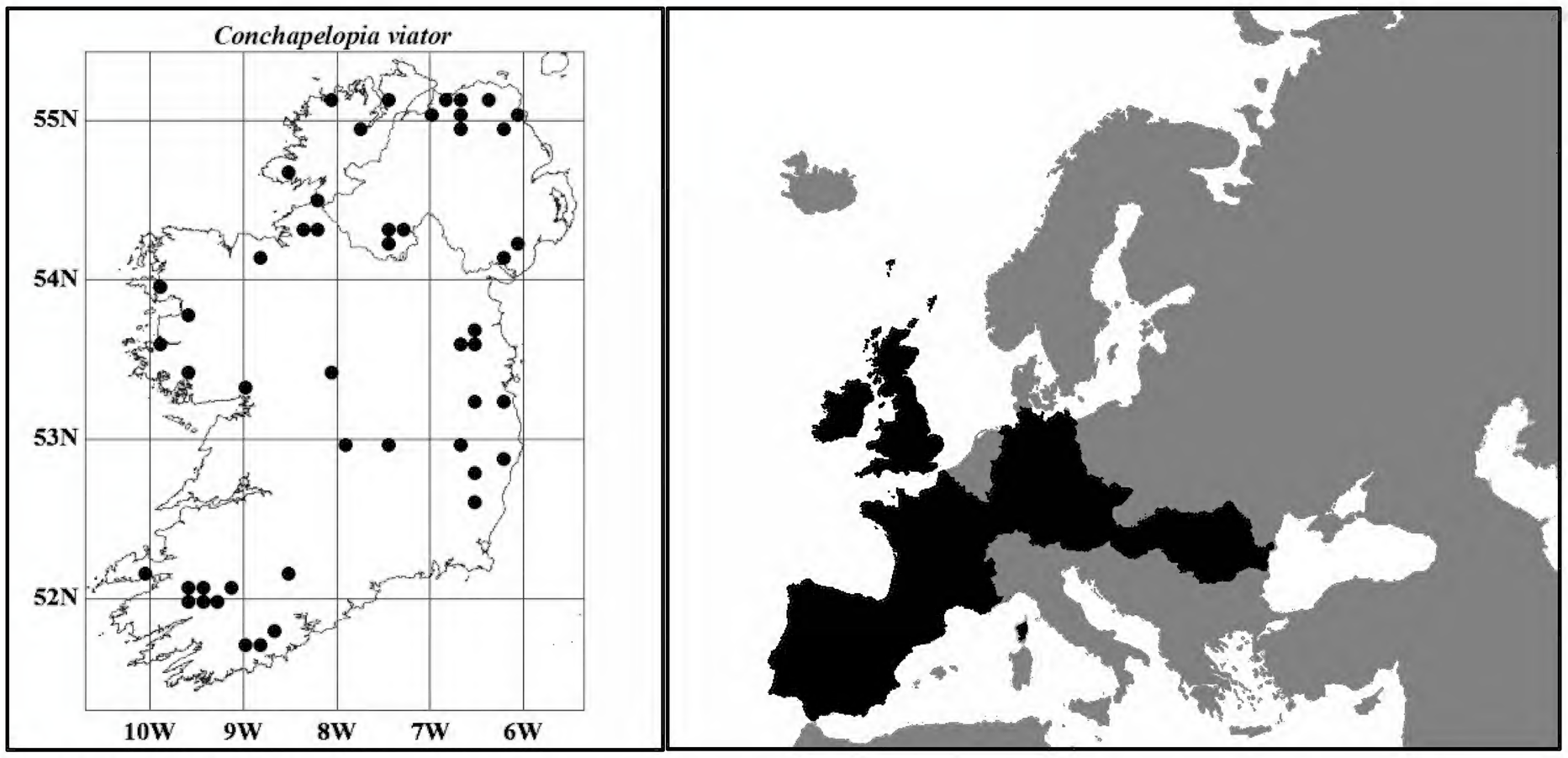
FIGURES 25-26. *Conchapelopia hittmairorum* Michiels & Spies, 2002.



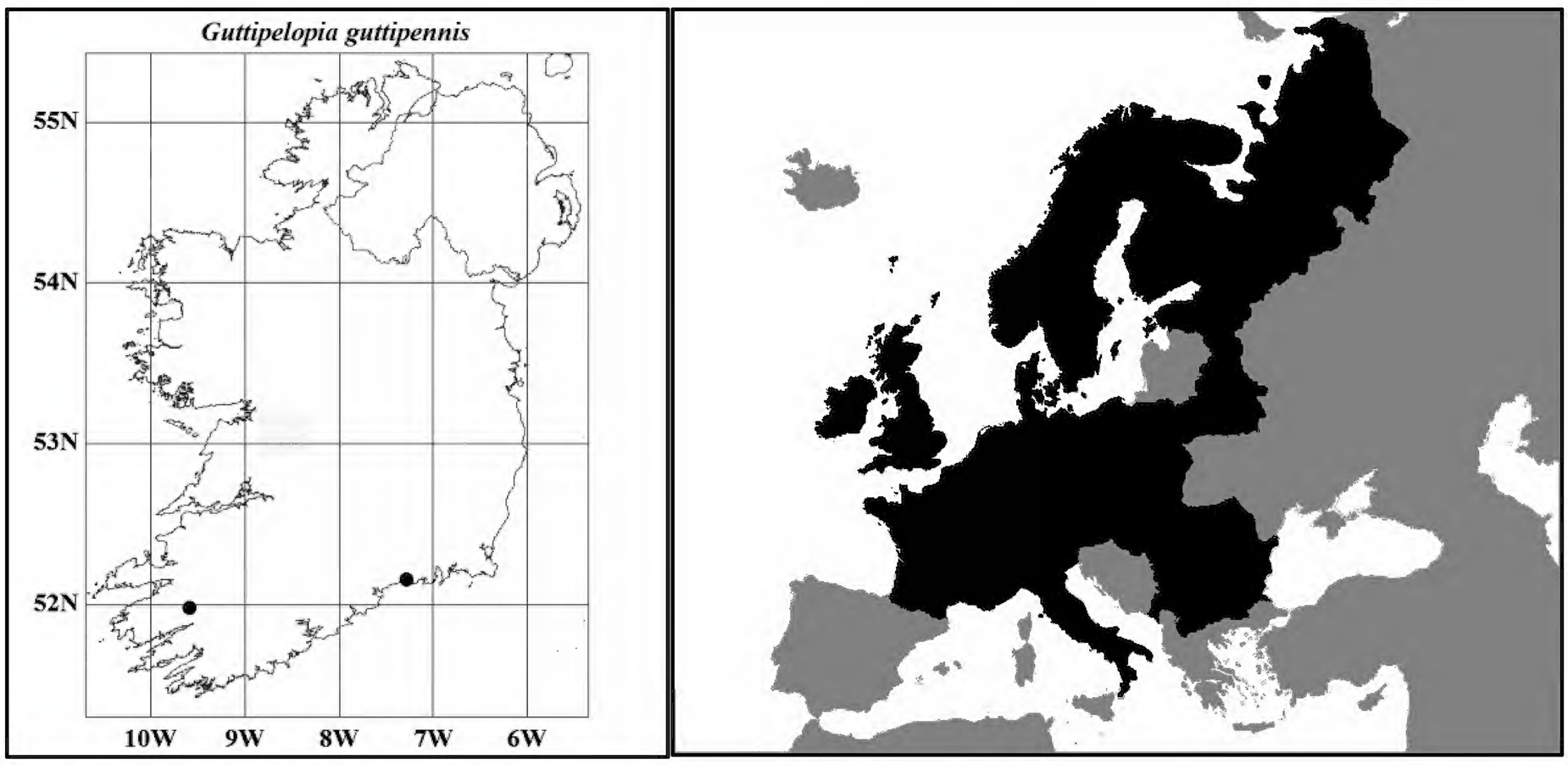
FIGURES 27-28. *Conchapelopia melanops* (Meigen, 1818).



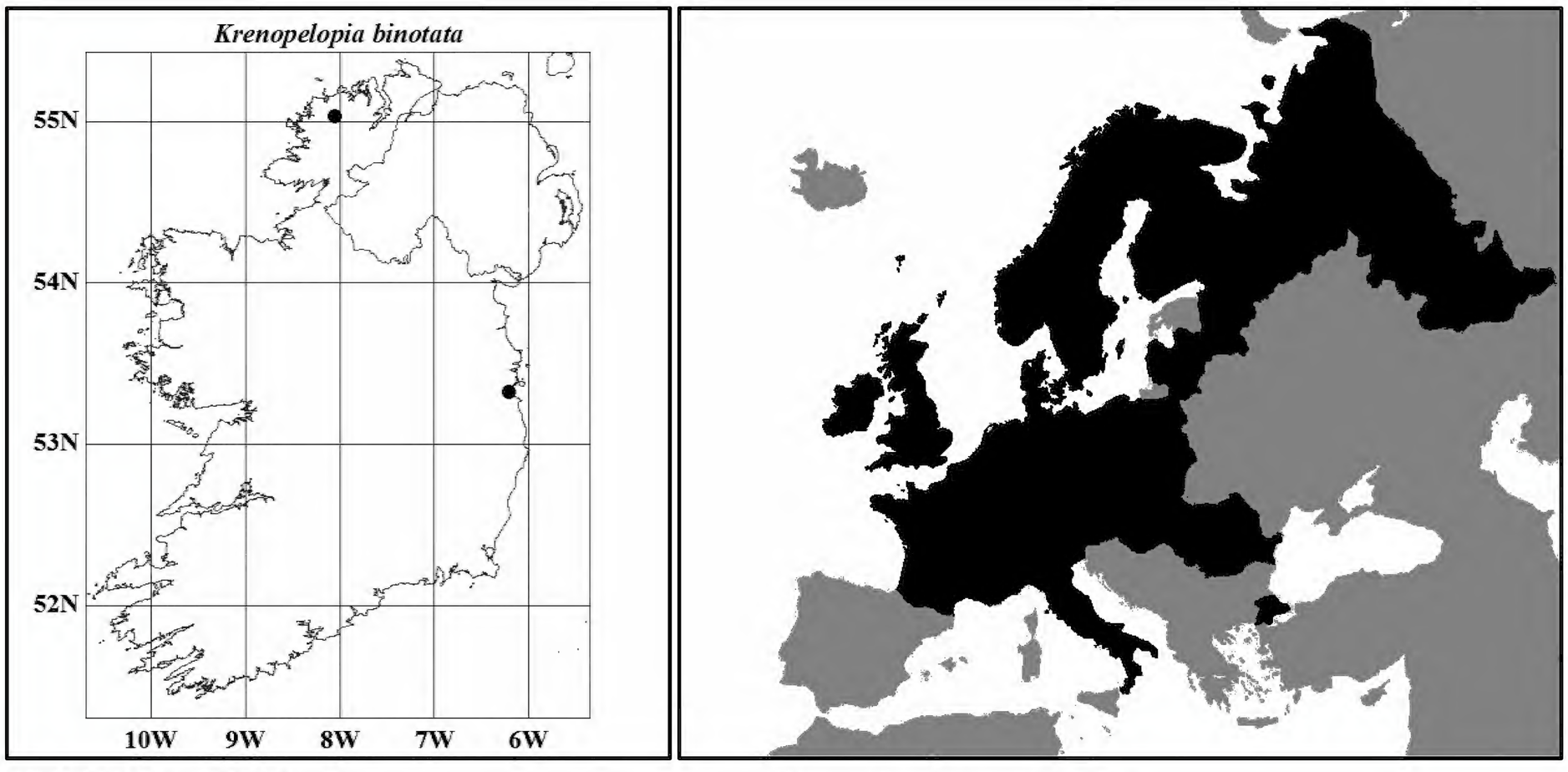
FIGURES 29-30. *Conchapelopia pallidula* (Meigen, 1818).



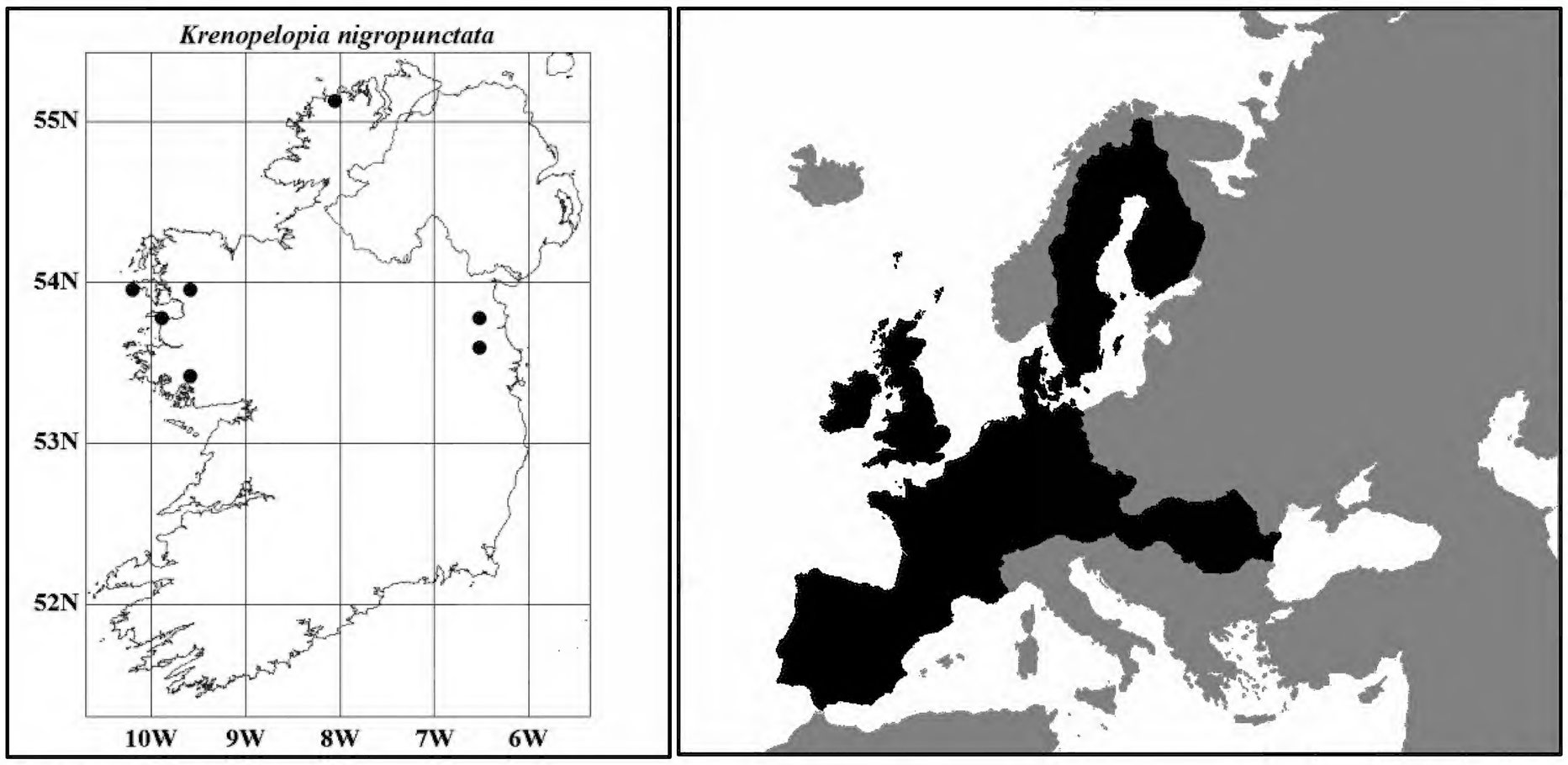
FIGURES 31-32. *Conchapelopia viator* (Kieffer, 1911).



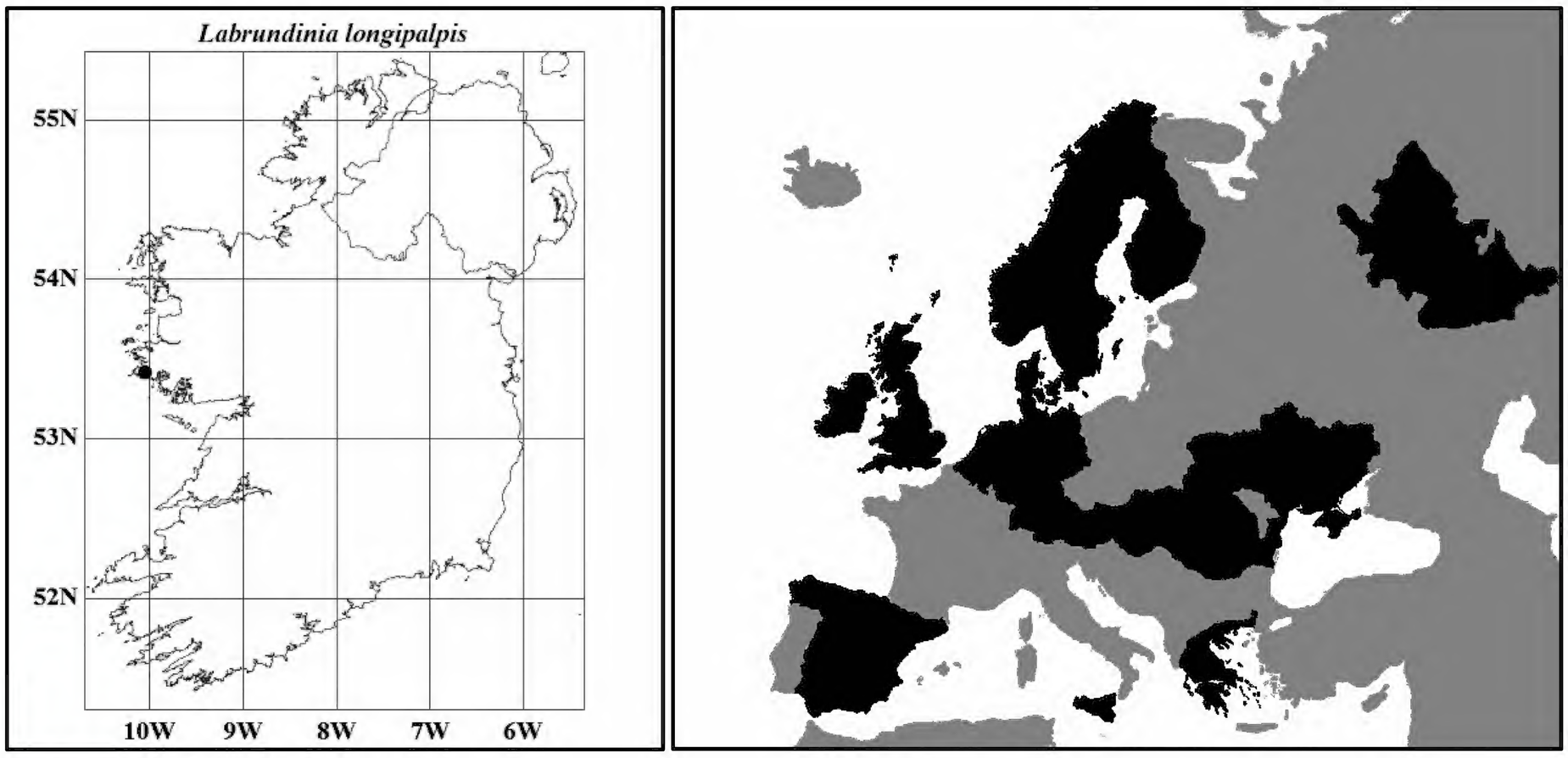
FIGURES 33-34. *Guttipelopia guttipennis* (van der Wulp, 1861).



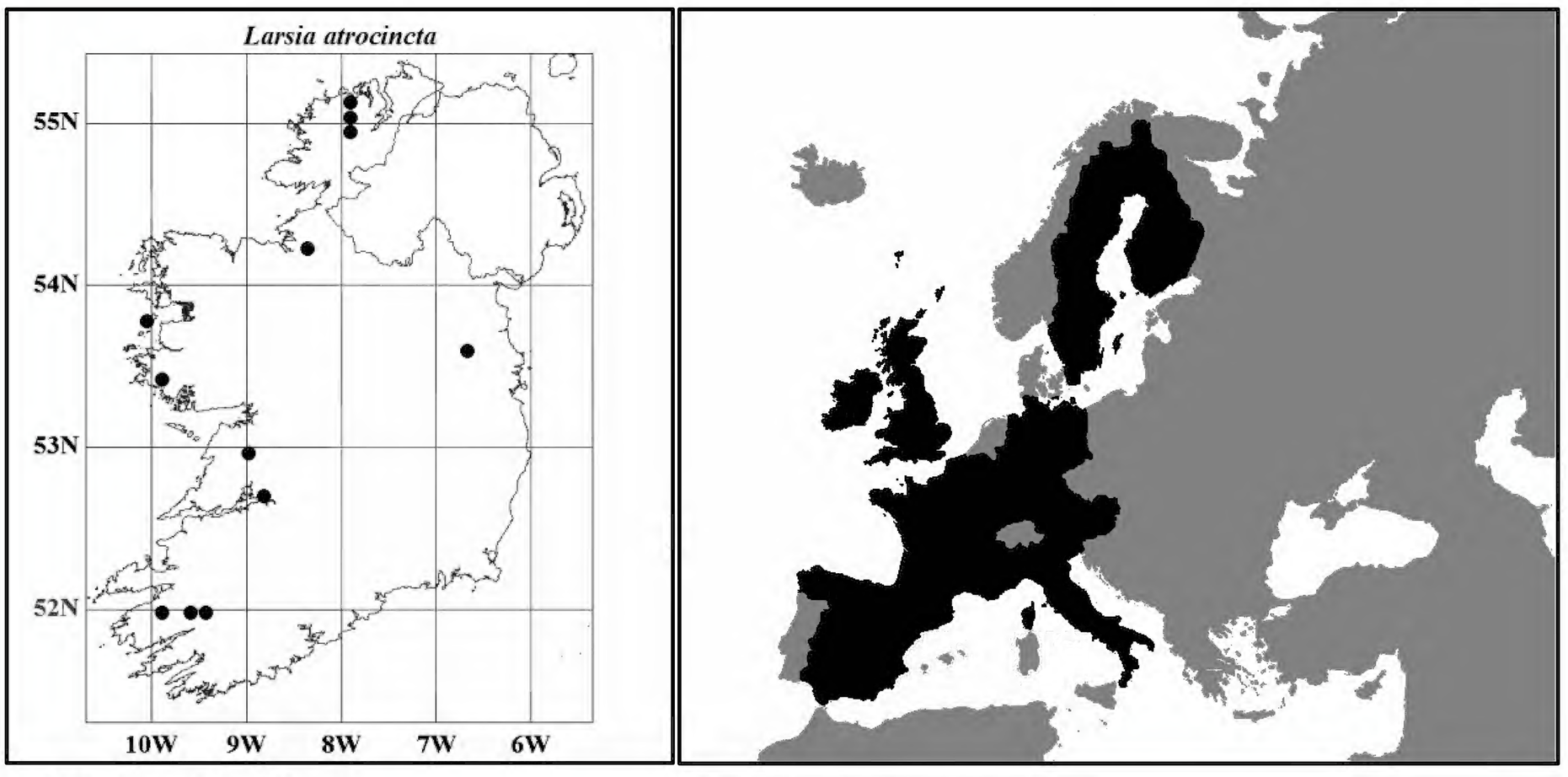
FIGURES 35-36. *Krenopelopia binotata* (Wiedemann, 1817).



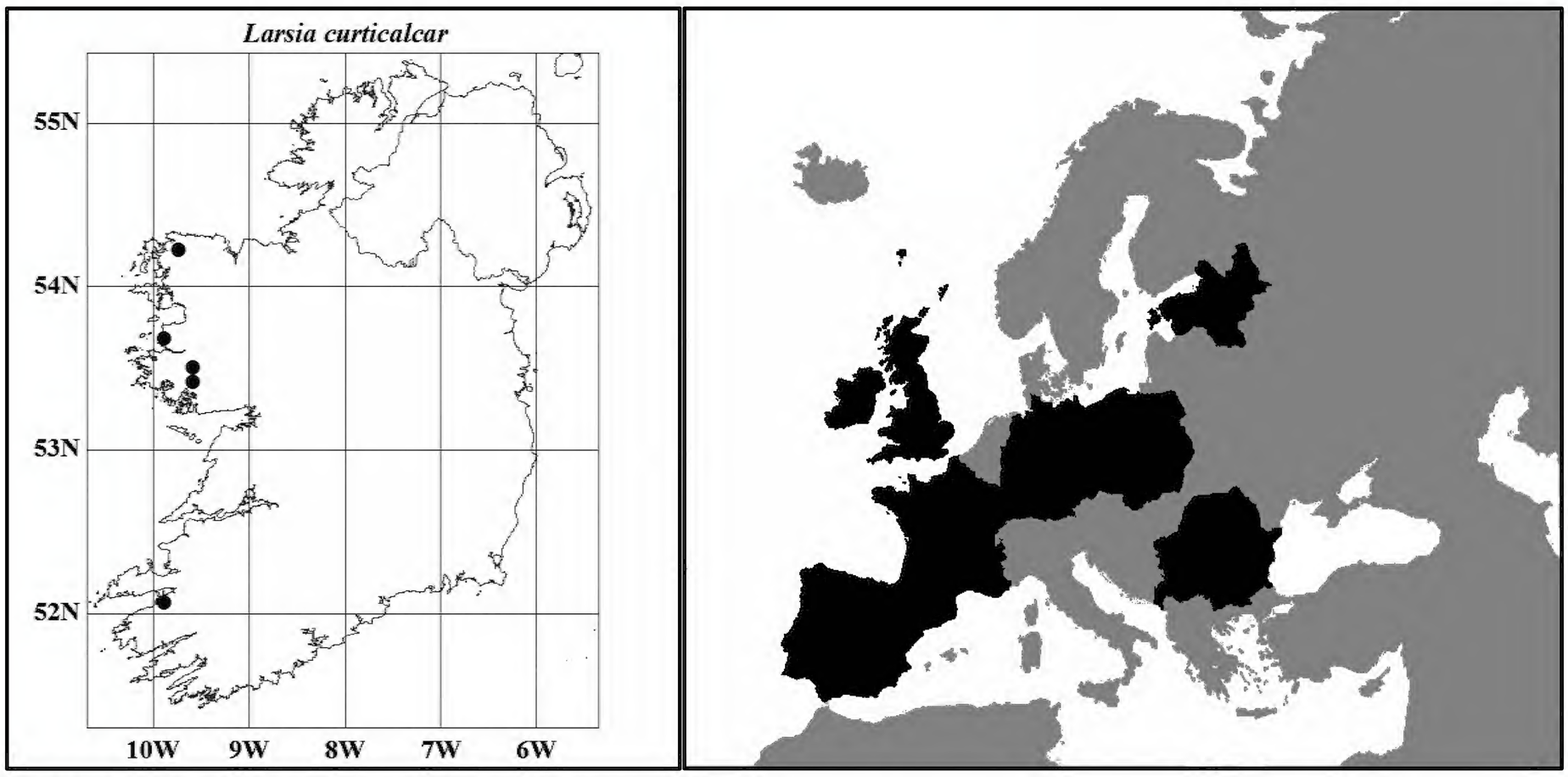
FIGURES 37-38. *Krenopelopia nigropunctata* (Staeger, 1839).



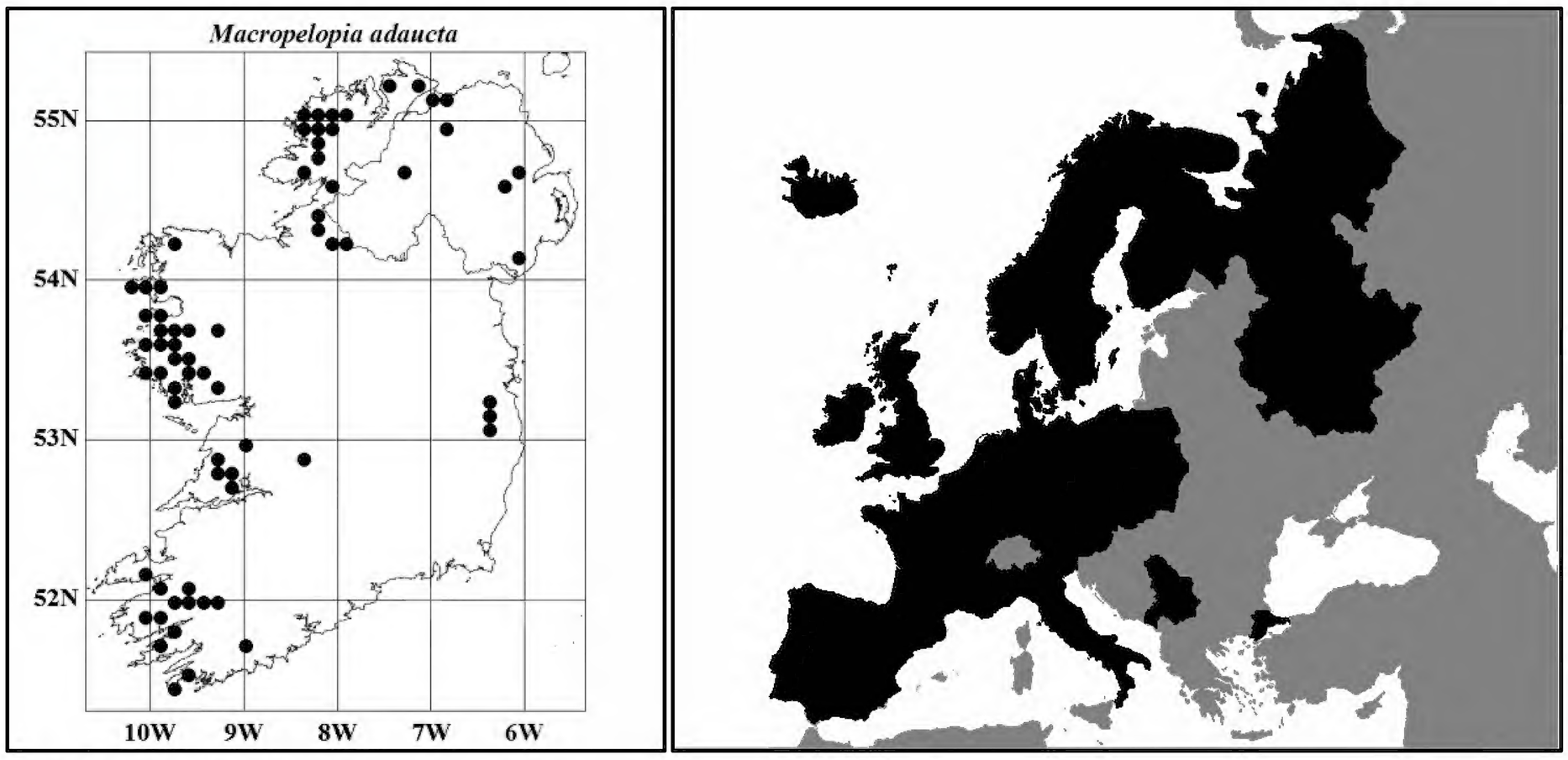
FIGURES 39-40. *Labrundinia longipalpis* (Goetghebuer, 1921).



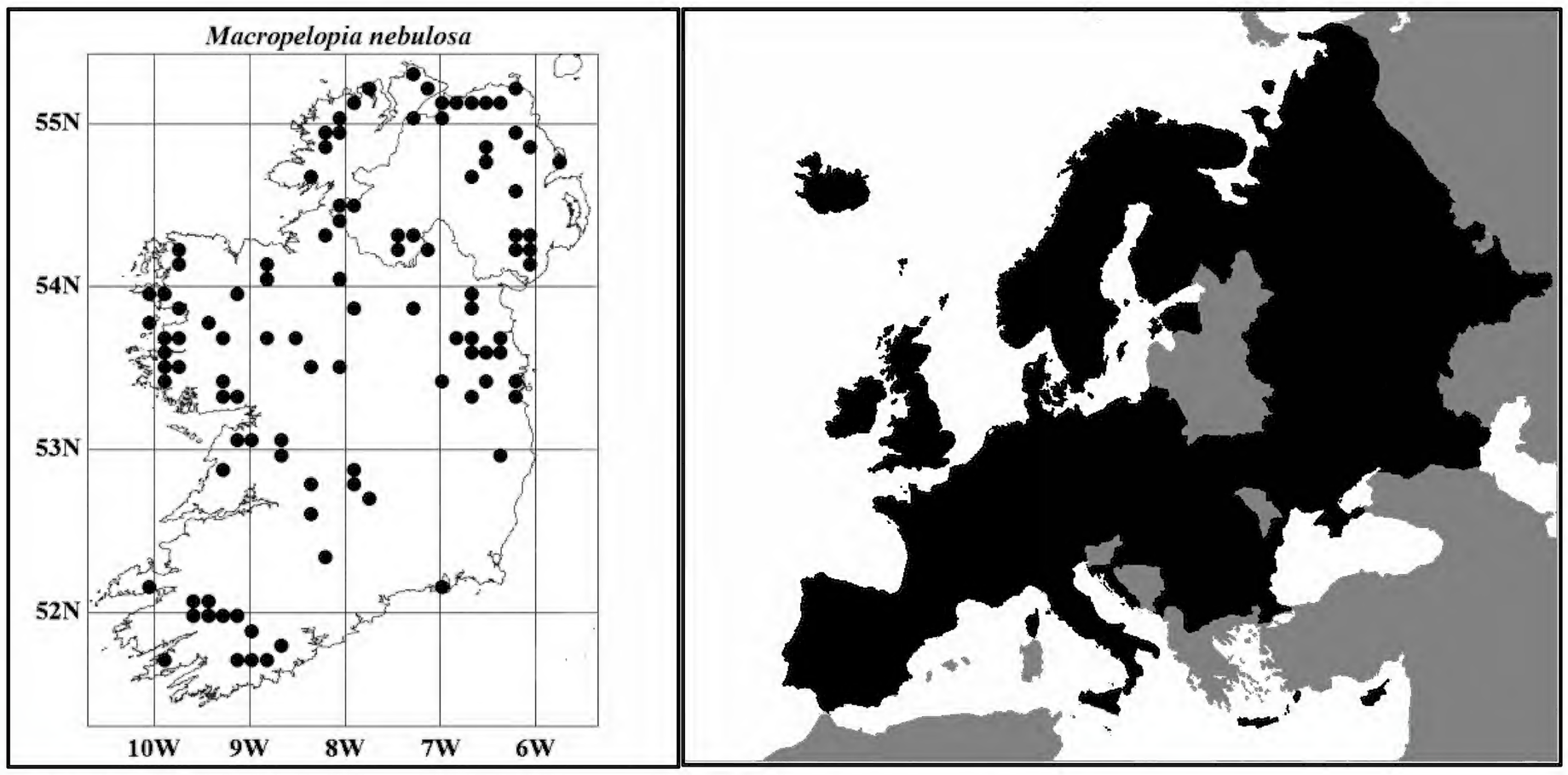
FIGURES 41-42. *Larsia atrocincta* (Goetghebuer, 1942).



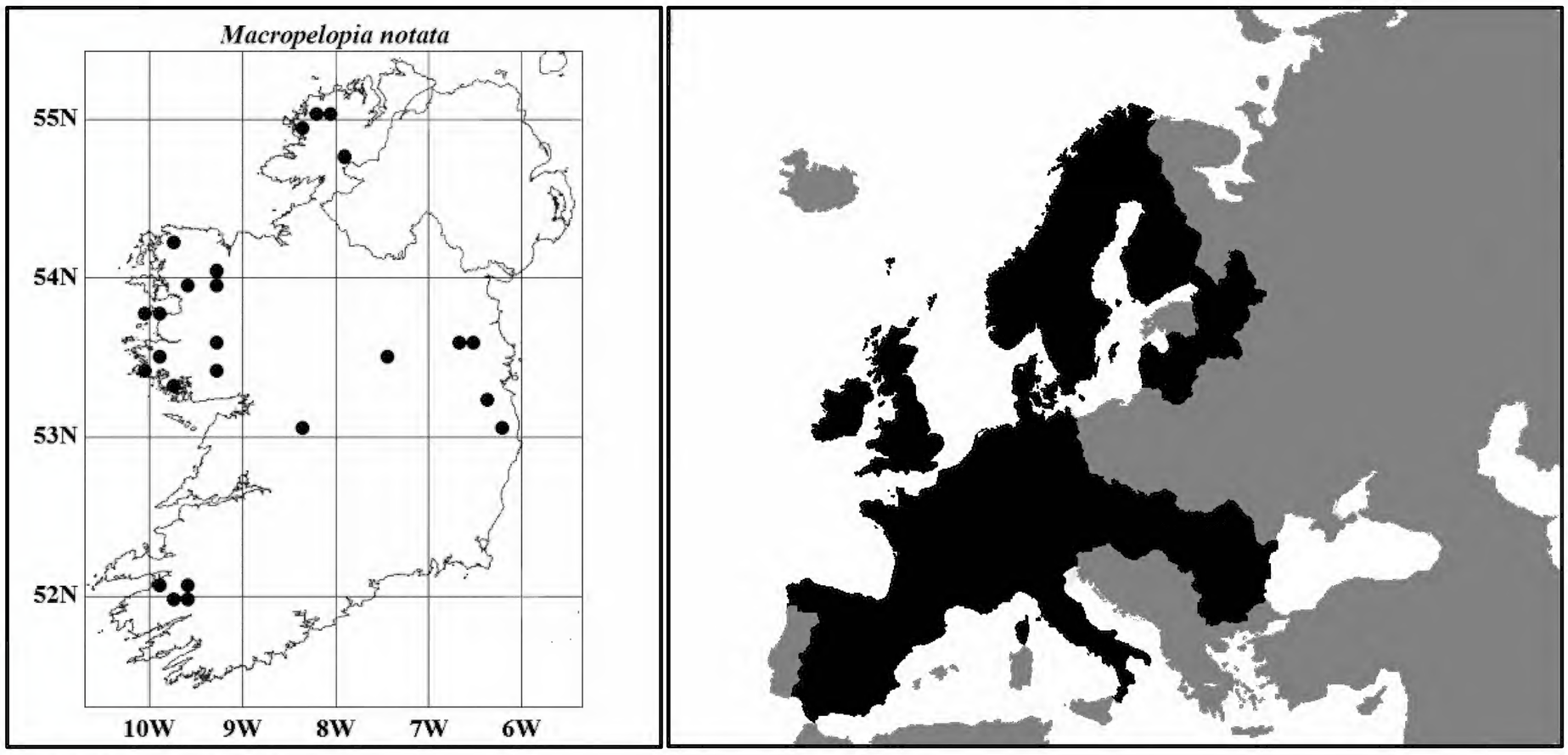
FIGURES 43-44. *Larsia curticalcar* (Kieffer, 1918).



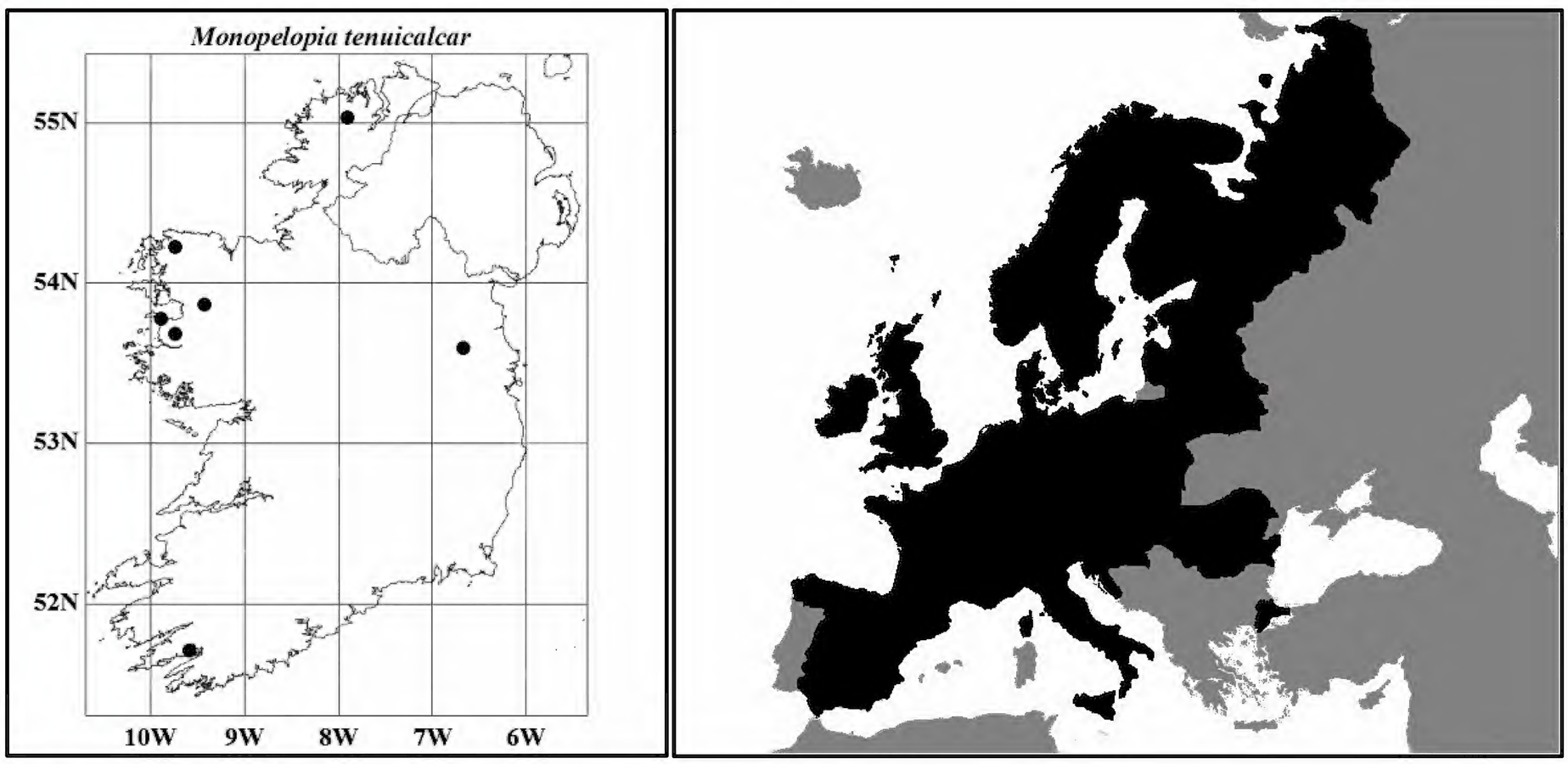
FIGURES 45-46. *Macropelopia adaucta* Kieffer, 1916.



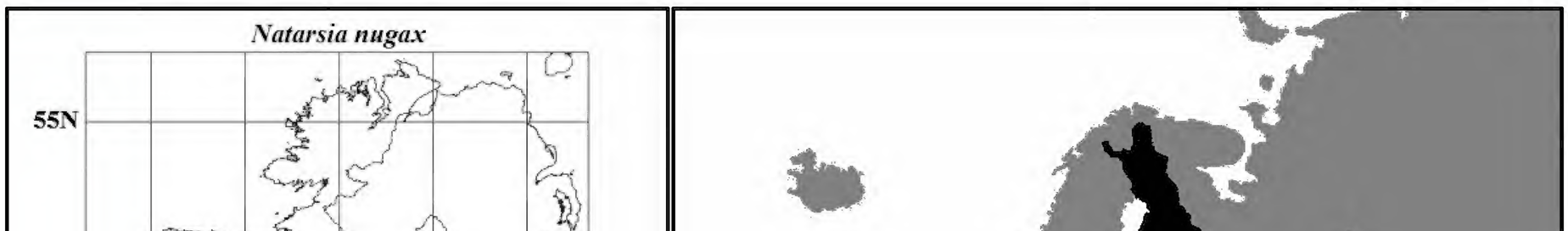
FIGURES 47-48. *Macropelopia nebulosa* (Meigen, 1804).



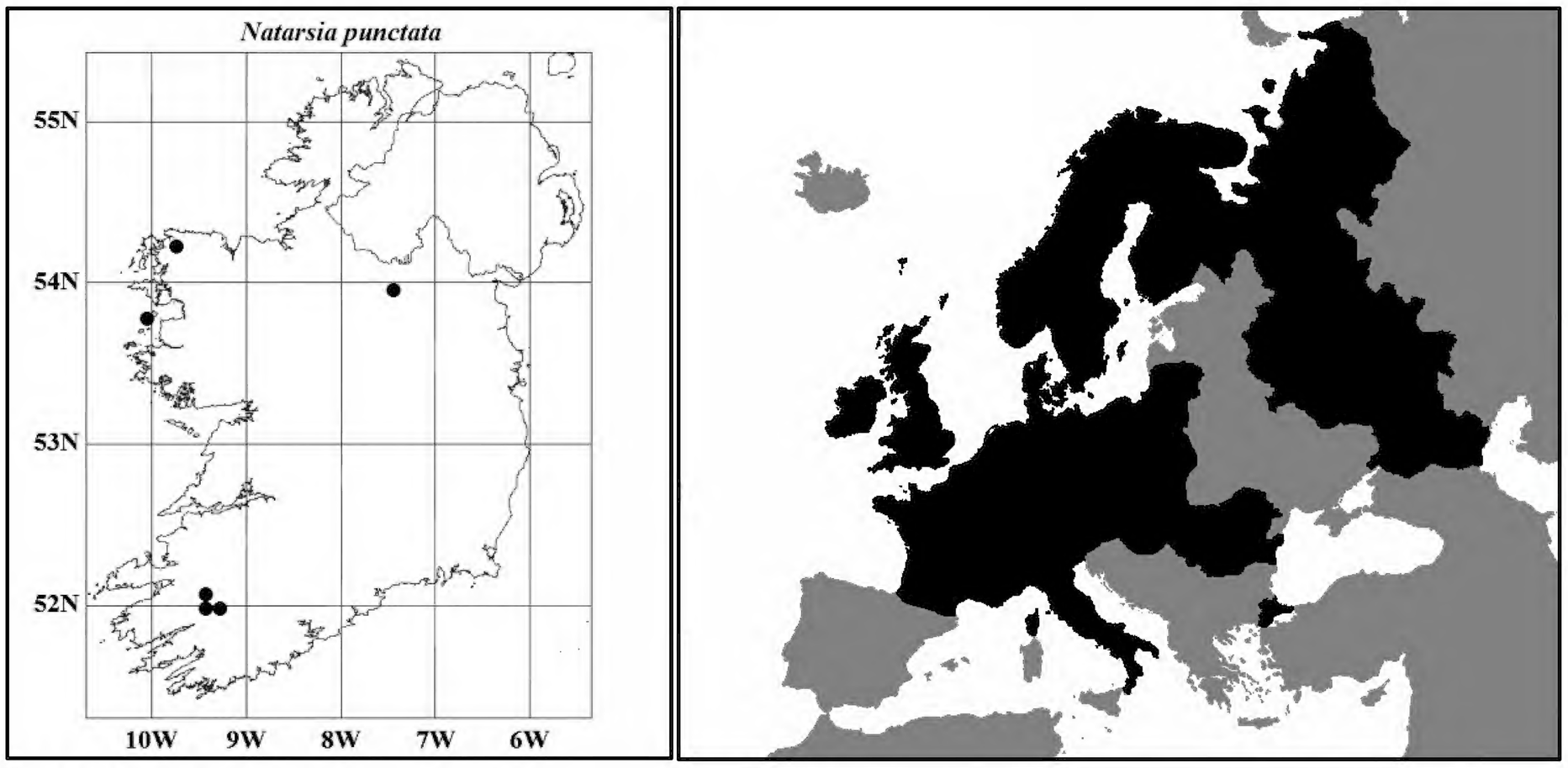
FIGURES 49-50. *Macropelopia notata* (Meigen, 1818).



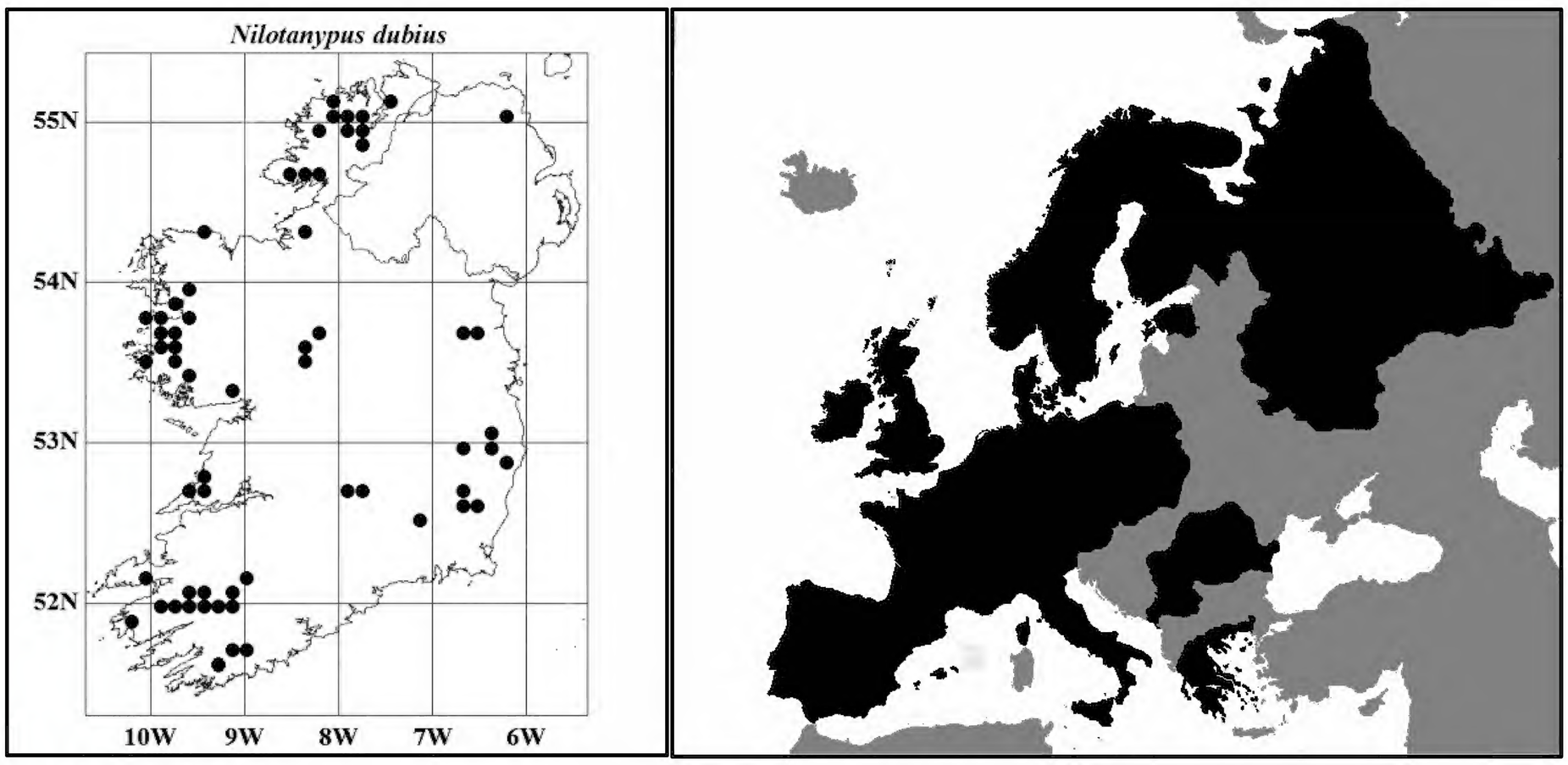
FIGURES 51-52. *Monopelopia tenuicalcar* (Kieffer, 1918).



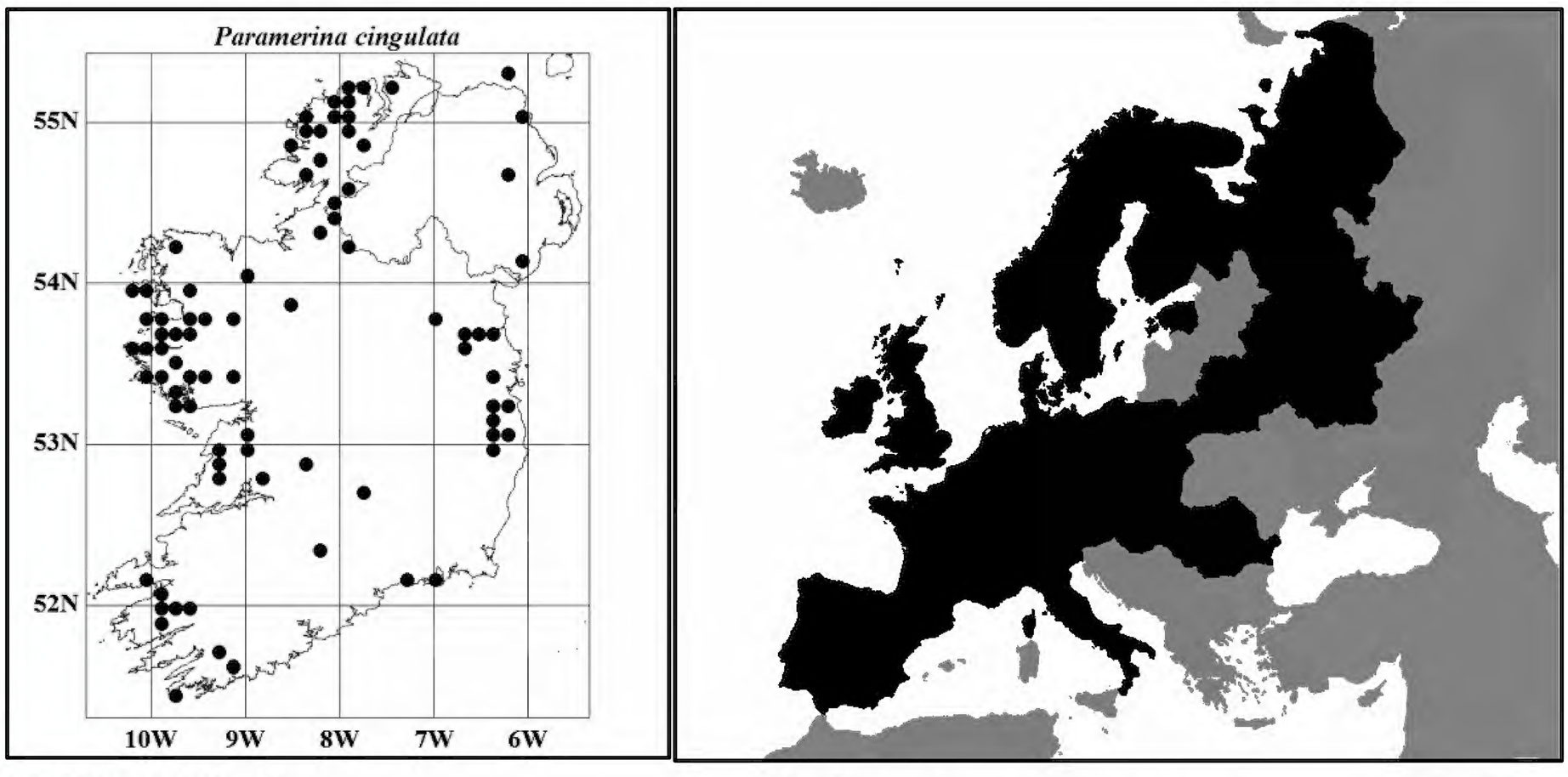
FIGURES 53-54. *Natarsia nugax* (Walker 1856).



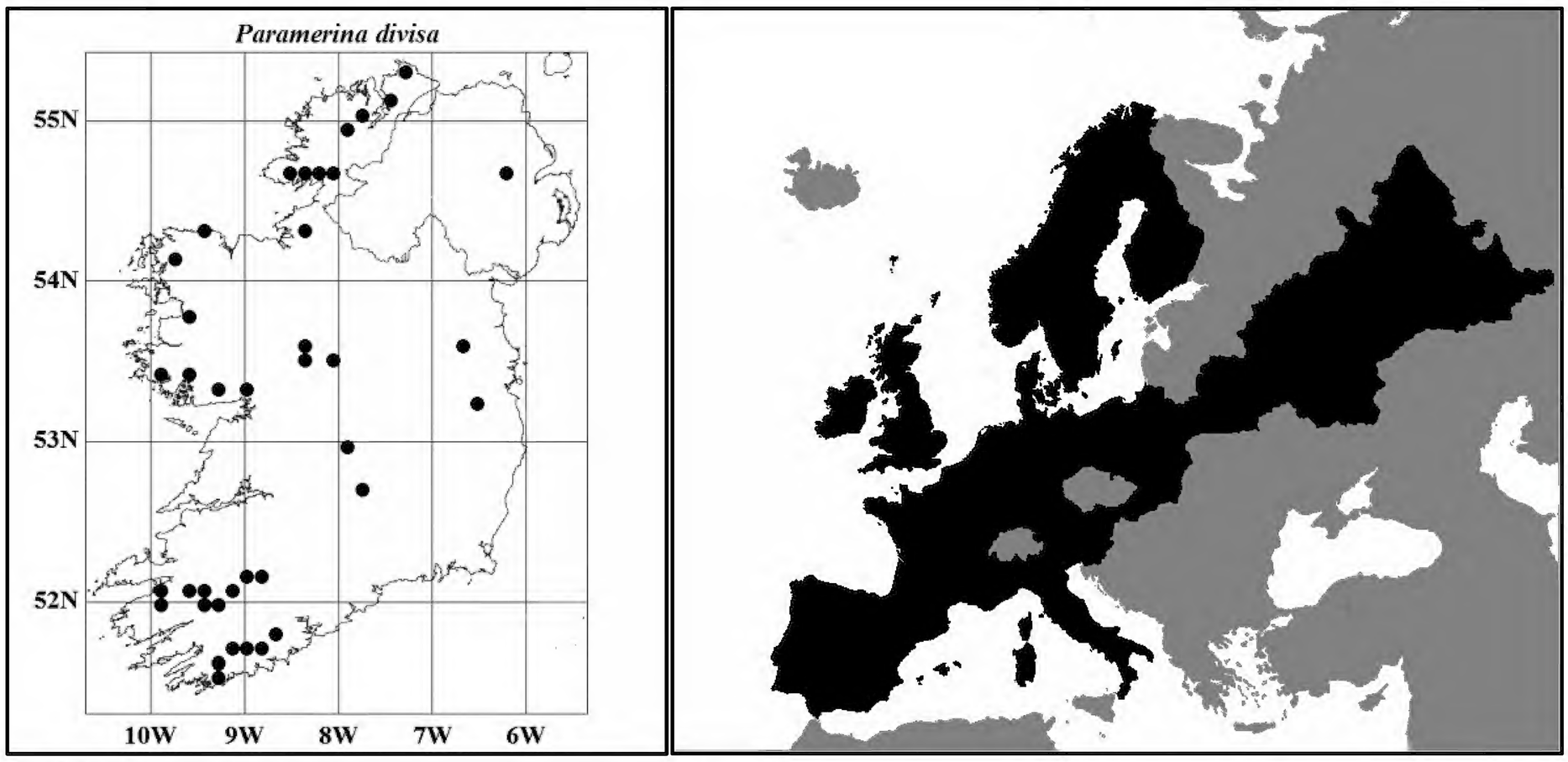
FIGURES 55-56. *Natarsia punctata* (Fabricius, 1805).



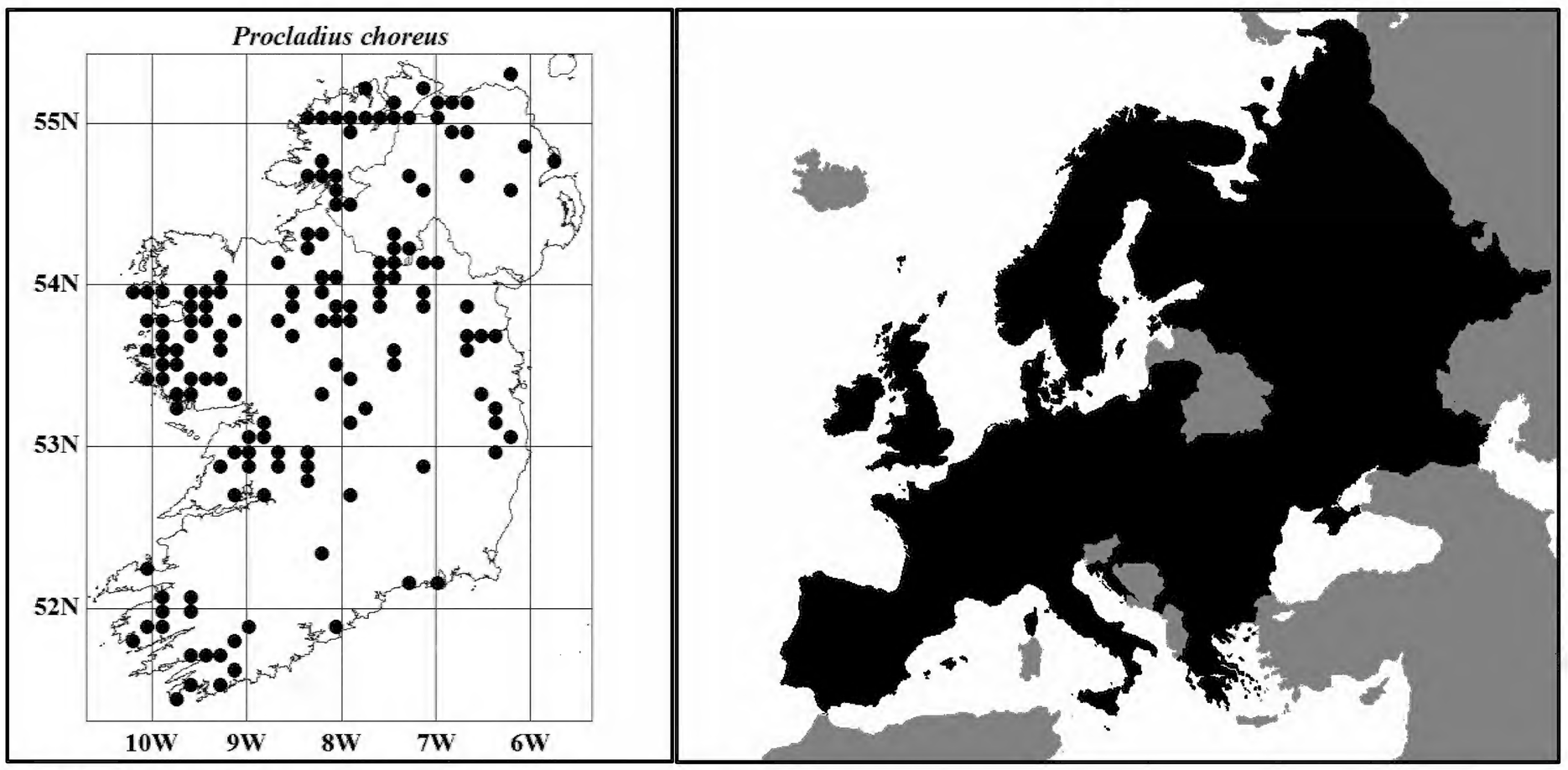
FIGURES 57-58. *Nilotanypus dubius* (Meigen, 1804).



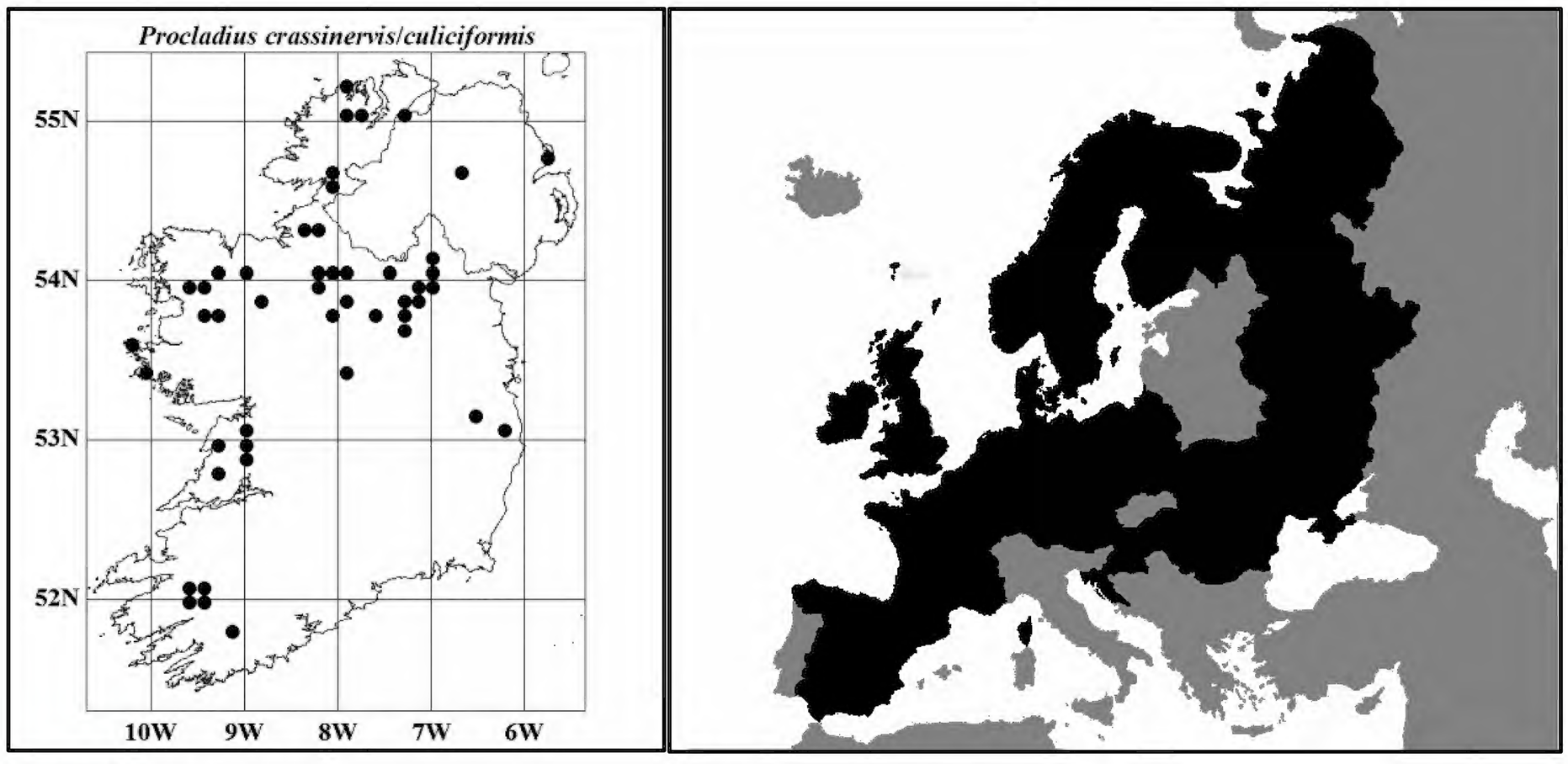
FIGURES 59-60. *Zavrelimyia cingulata* (Walker, 1856). See also pages 218-219.



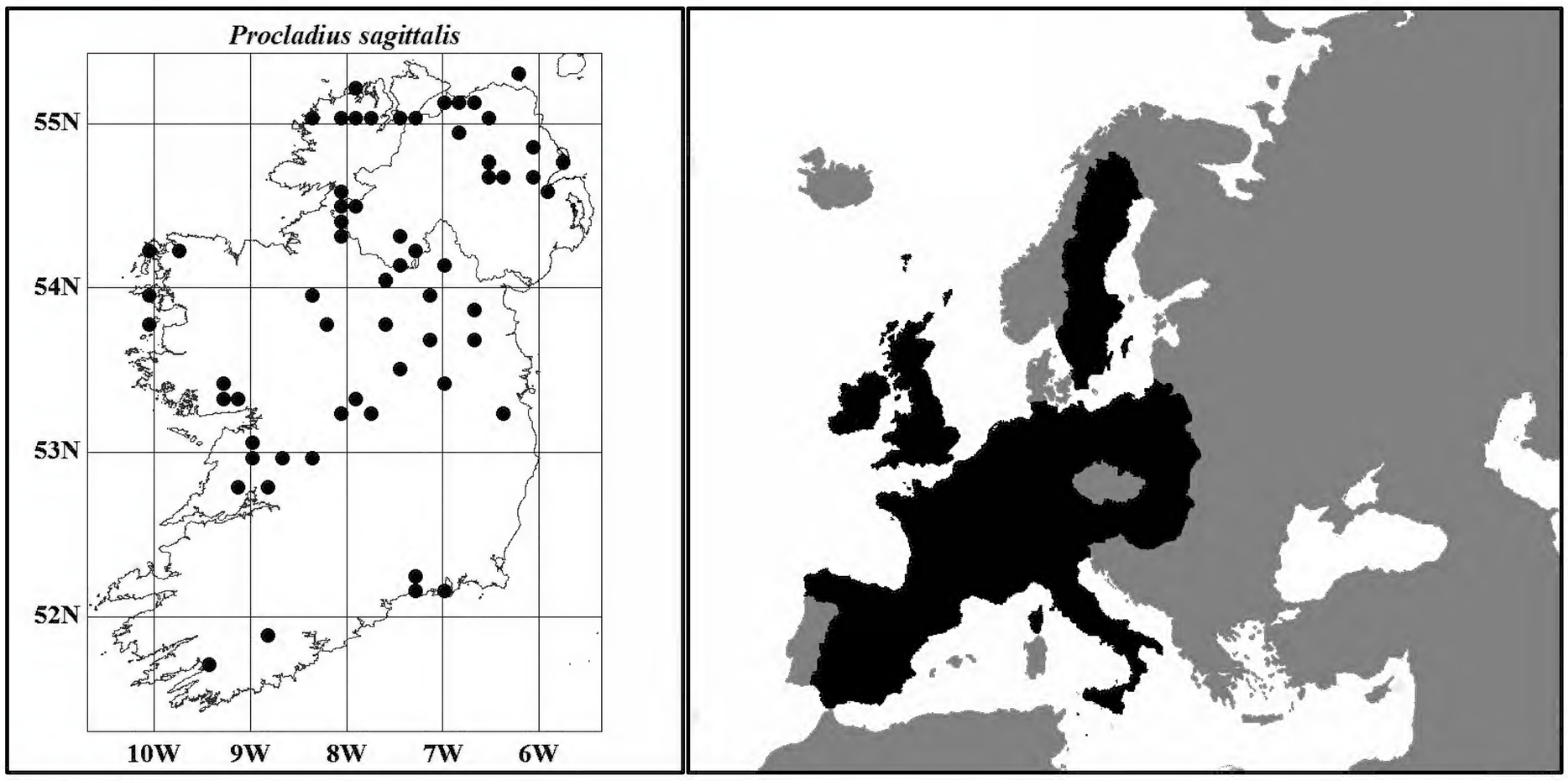
FIGURES 61-62. *Zavrelimyia divisa* (Walker, 1856). See also pages 218-219.



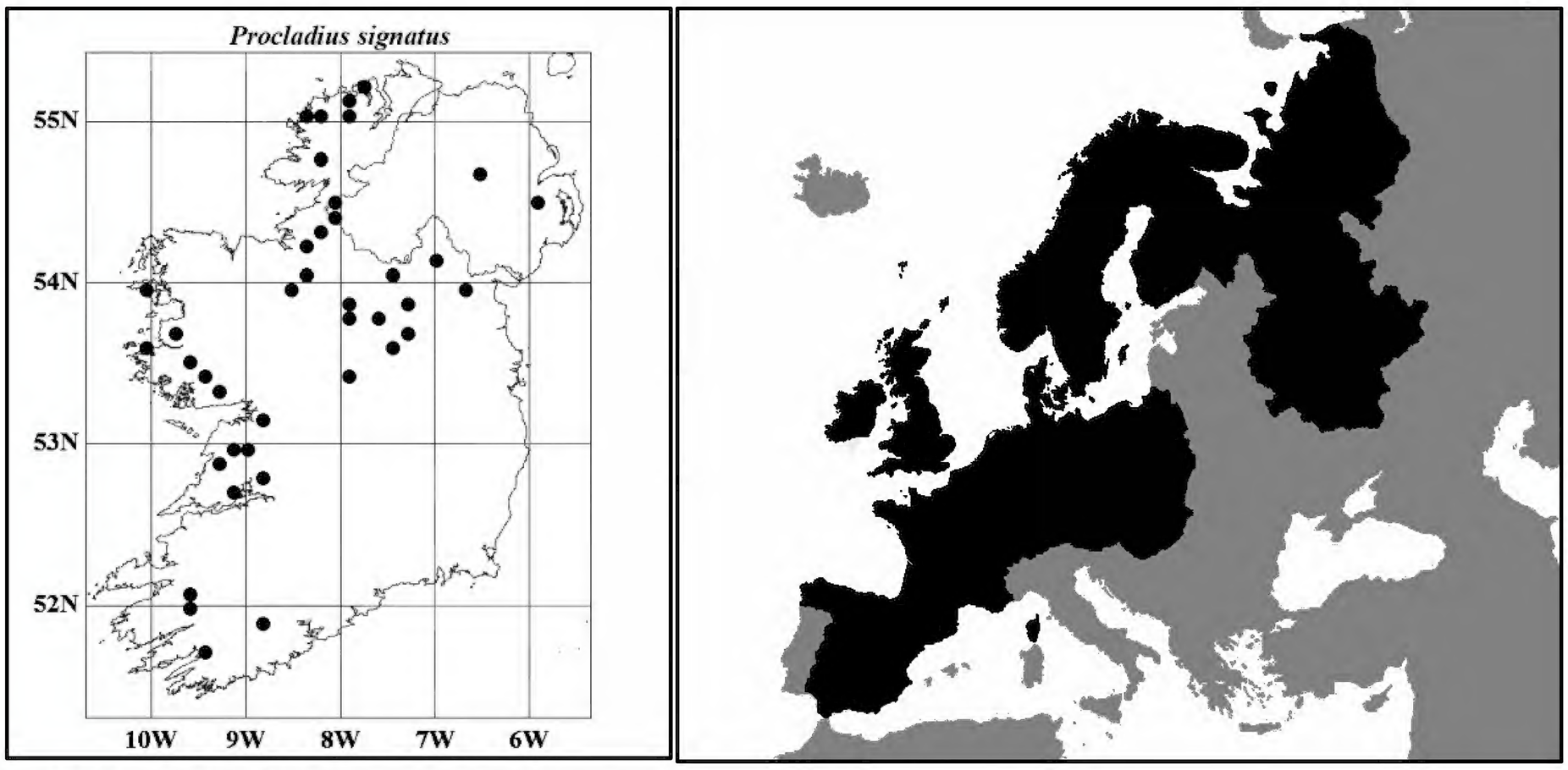
FIGURES 63-64. *Procladius choreus* (Meigen, 1804).



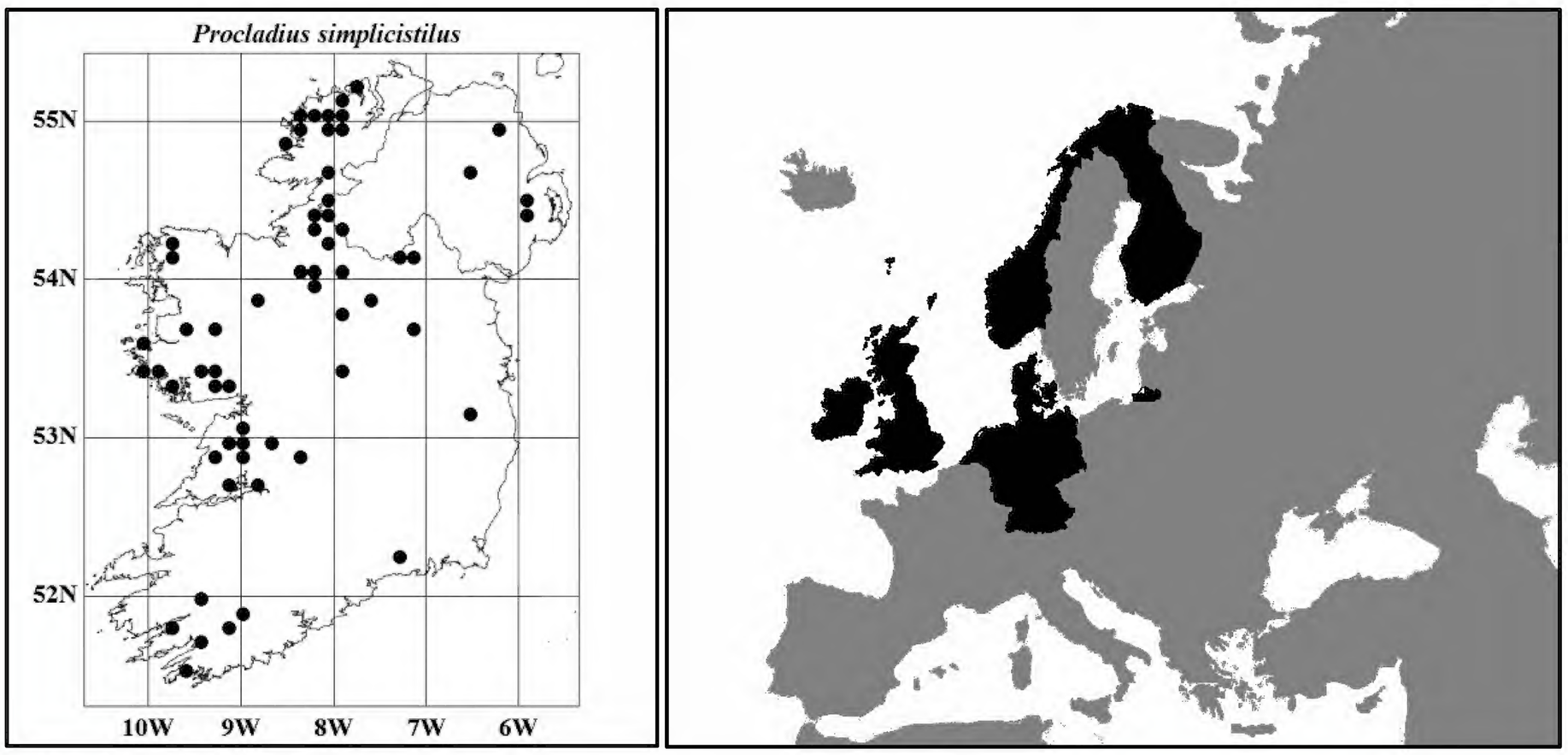
FIGURES 65-66. *Procladius crassinervis* (Zetterstedt, 1834)/*culiciformis* (L., 1767).



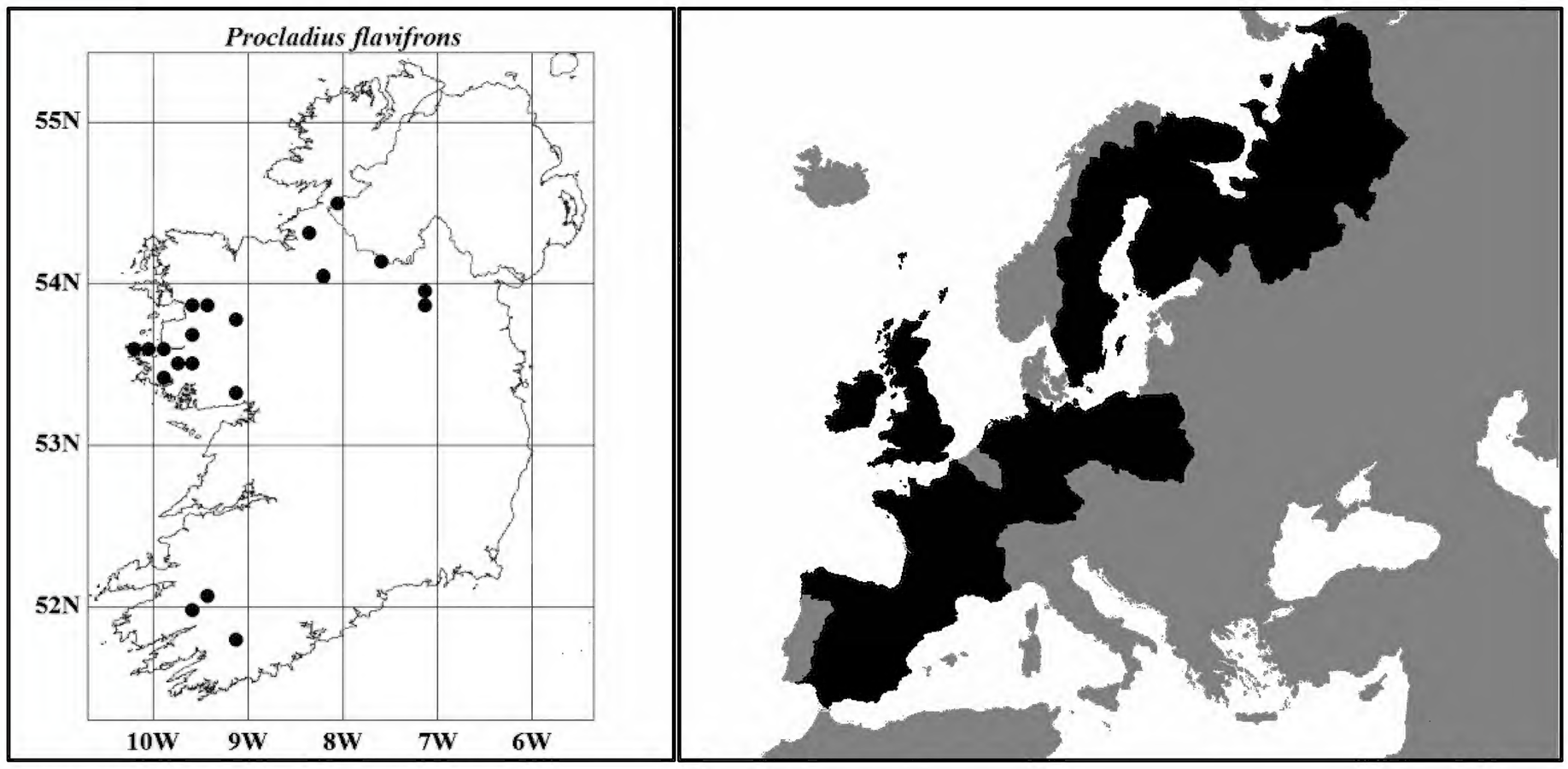
FIGURES 67-68. *Procladius sagittalis* (Kieffer, 1909).



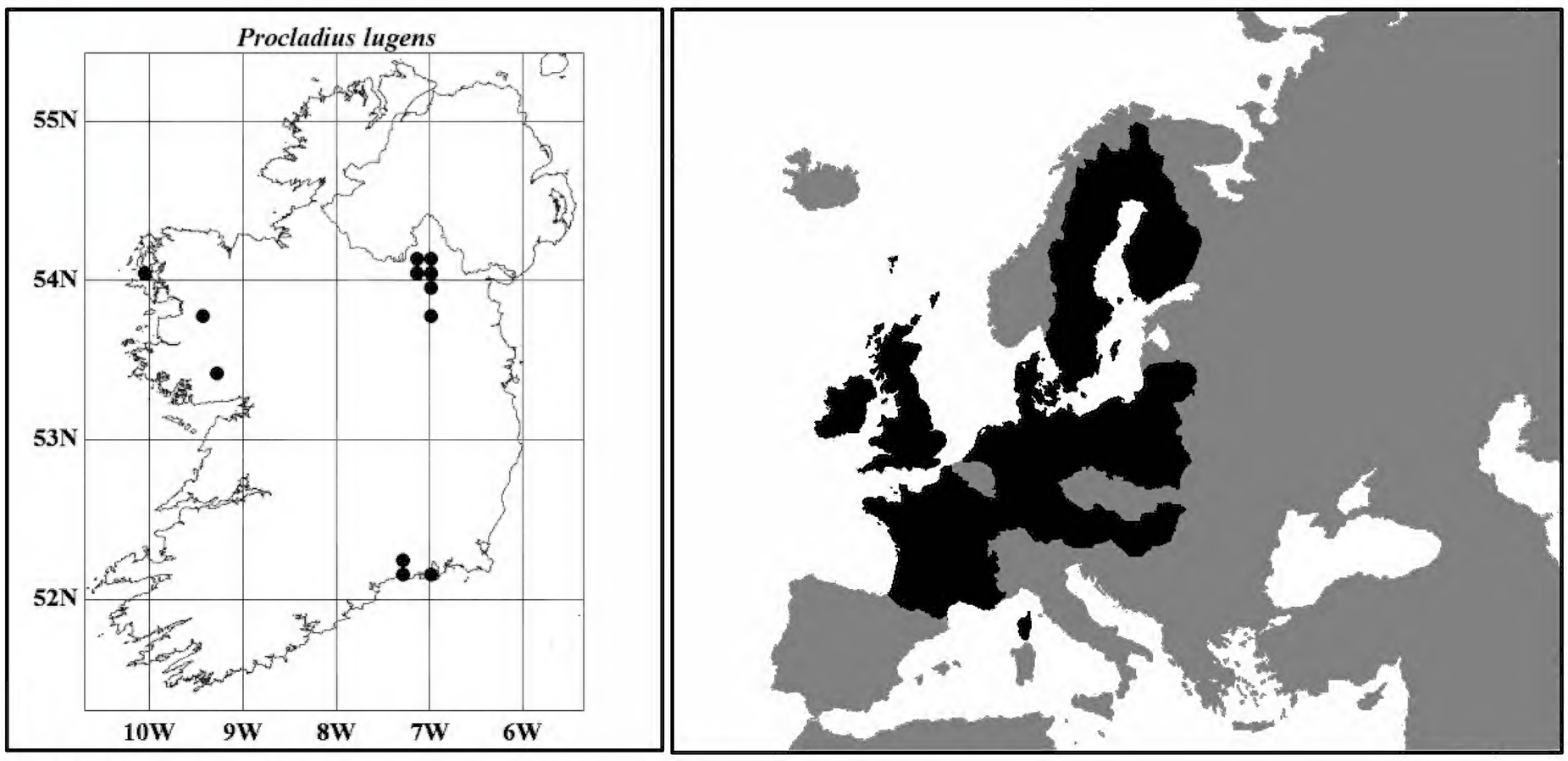
FIGURES 69-70. *Procladius signatus* (Zetterstedt, 1850).



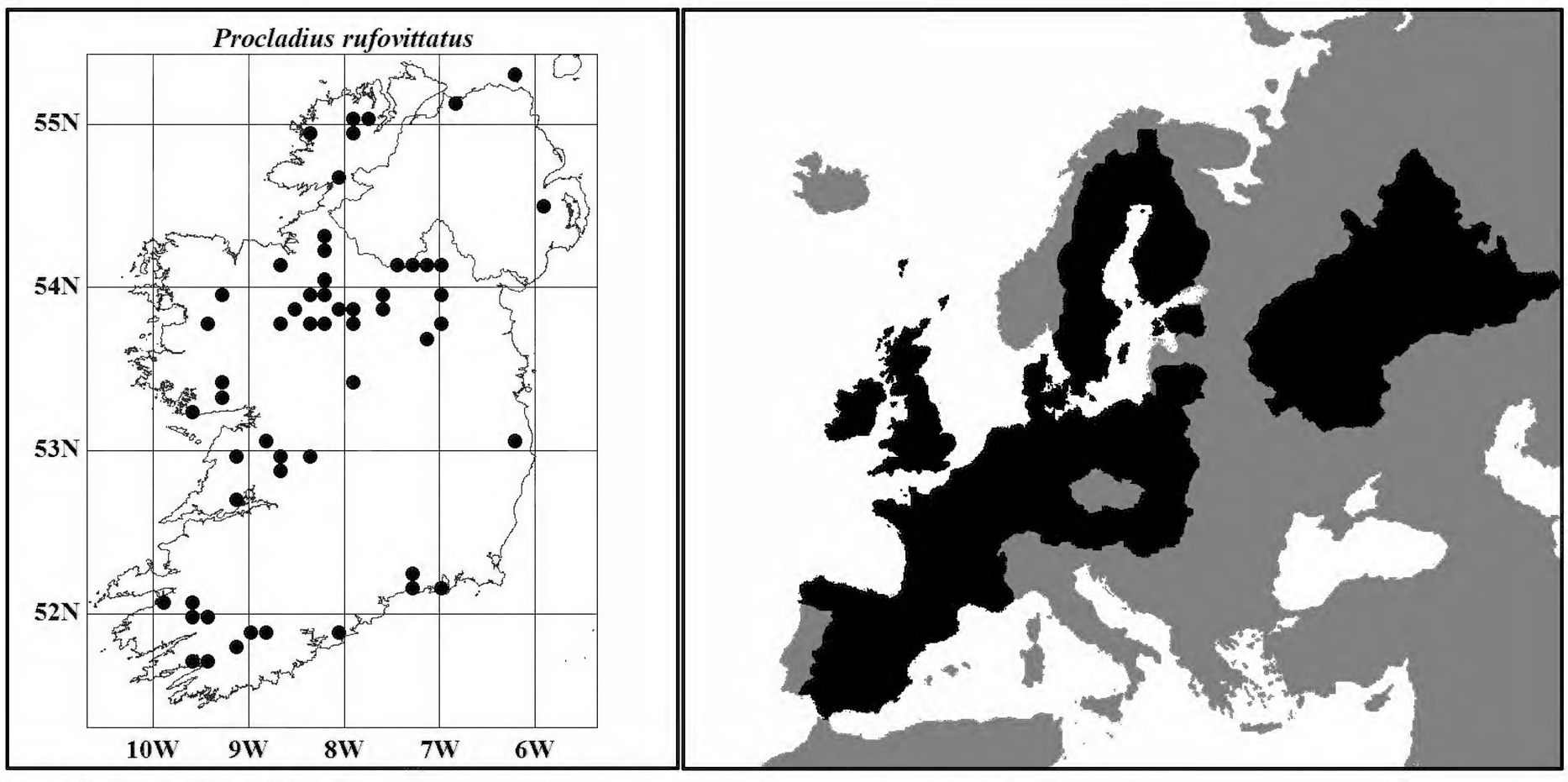
FIGURES 71-72. *Procladius simplicistilus* Freeman, 1948.



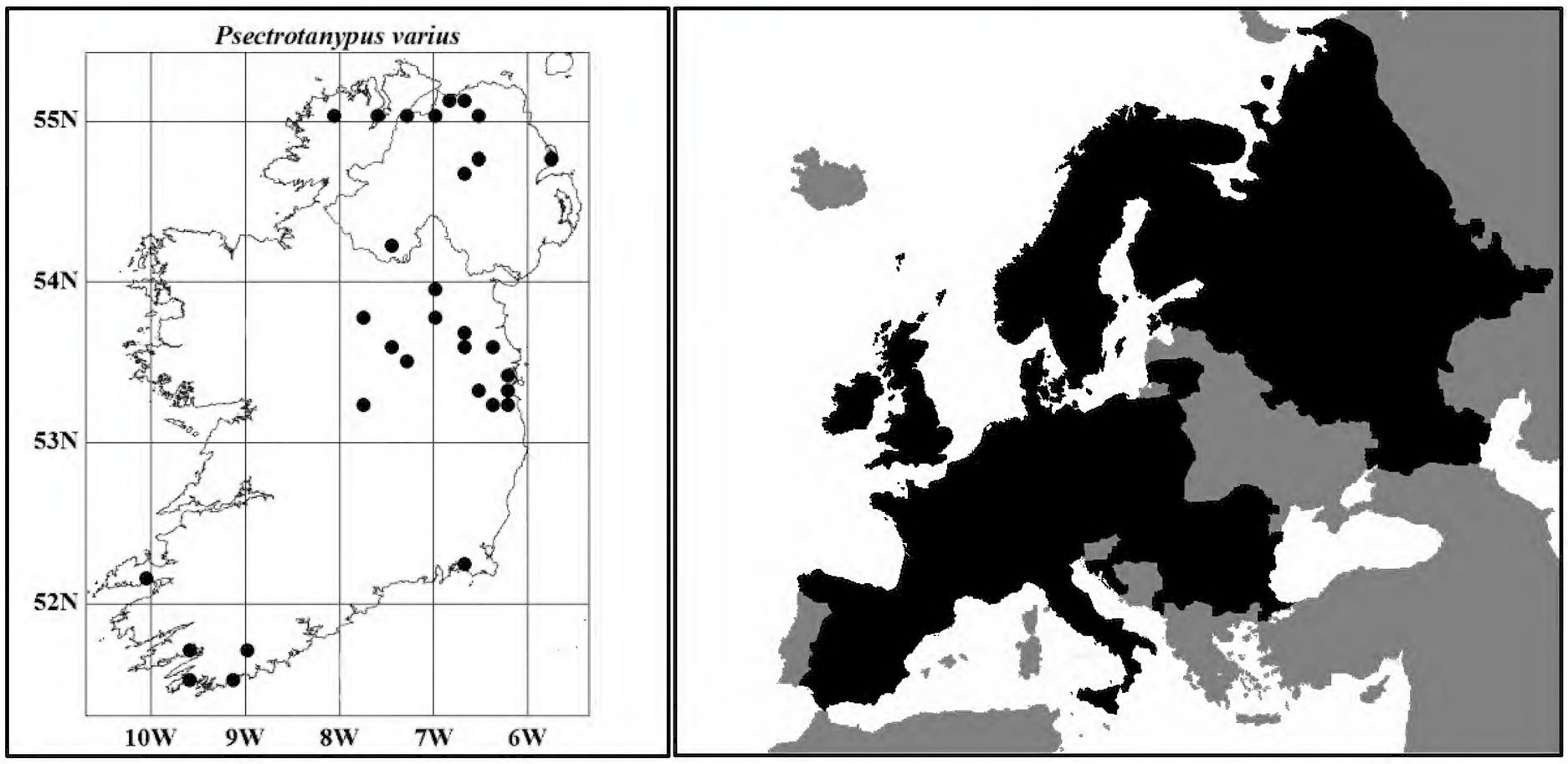
FIGURES 73-74. *Procladius flavifrons* Edwards, 1929.



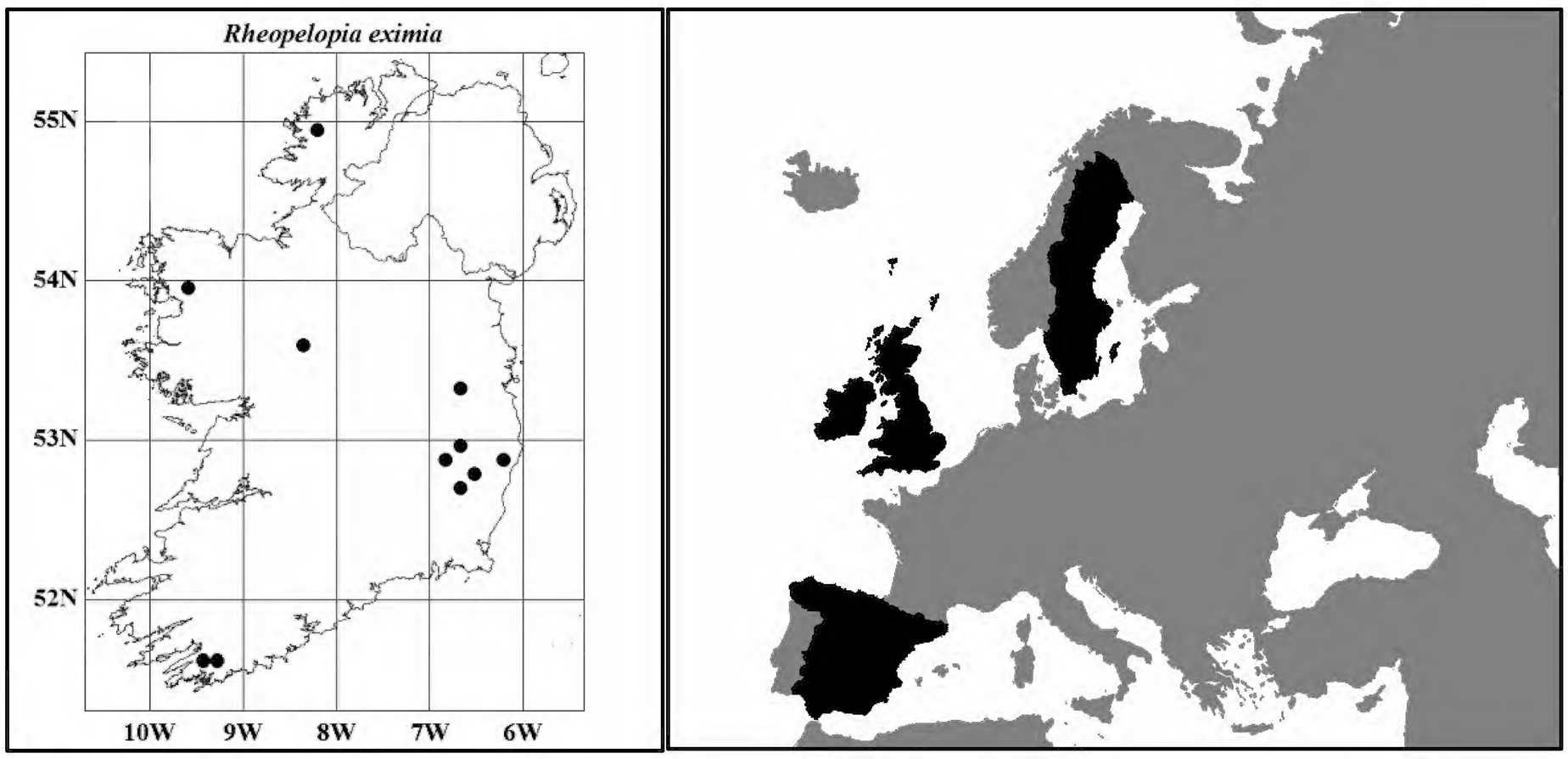
FIGURES 75-76. *Procladius lugens* Kieffer, 1915.



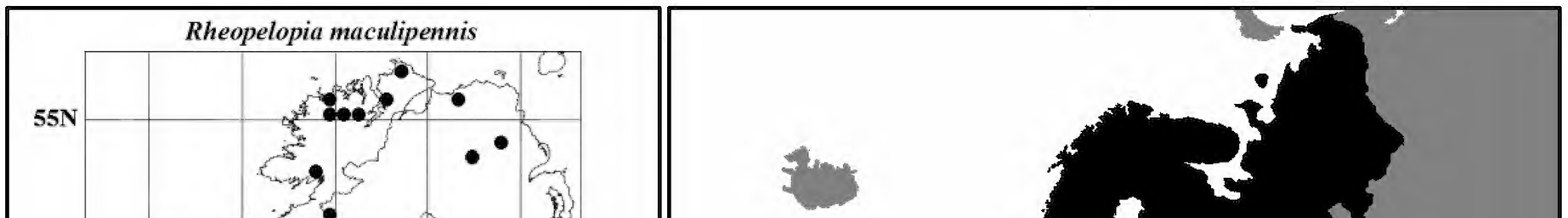
FIGURES 77-78. *Procladius rufovittatus* (van der Wulp, 1874).



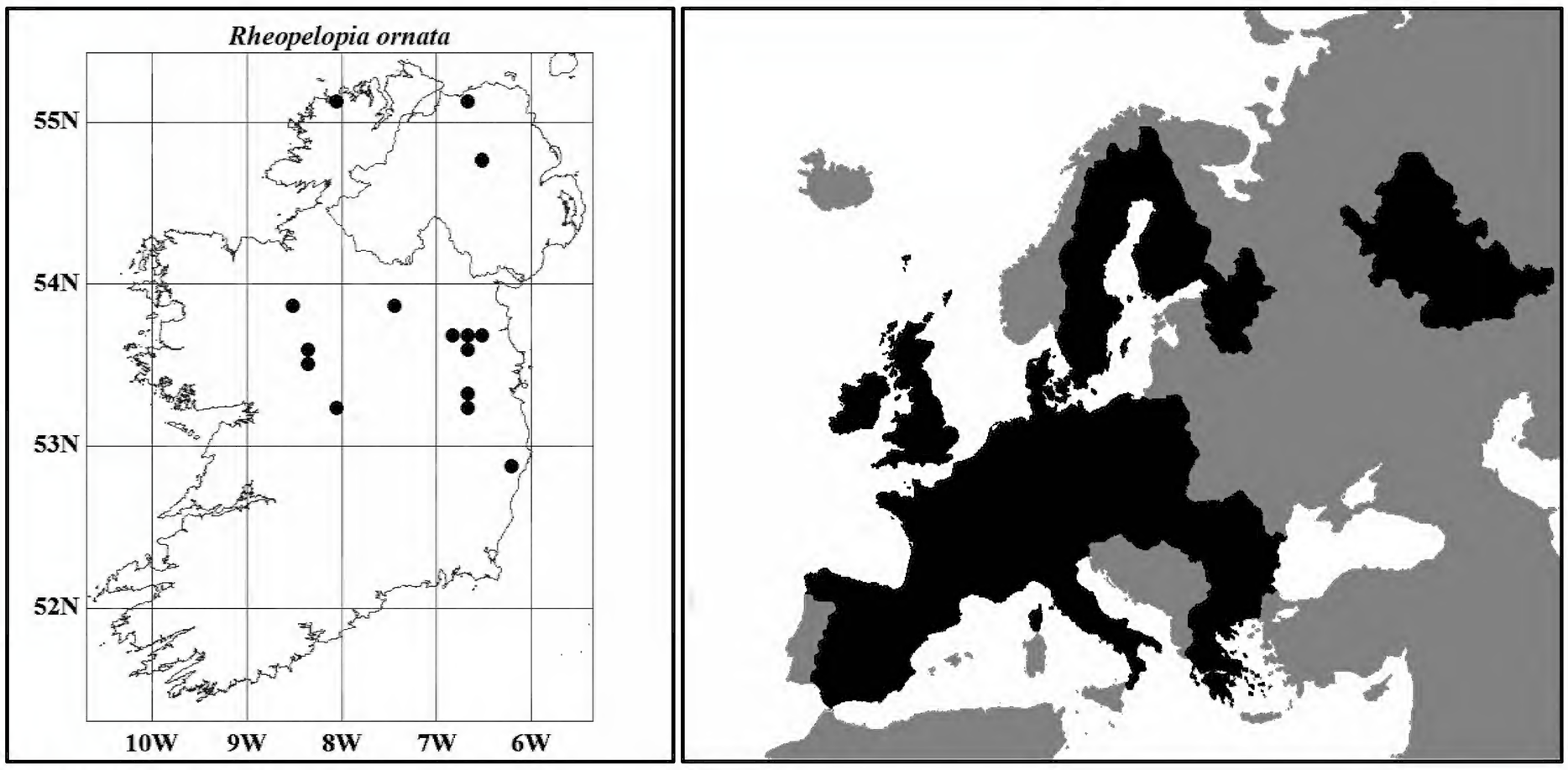
FIGURES 79-80. *Psectrotanypus varius* (Fabricius, 1787).



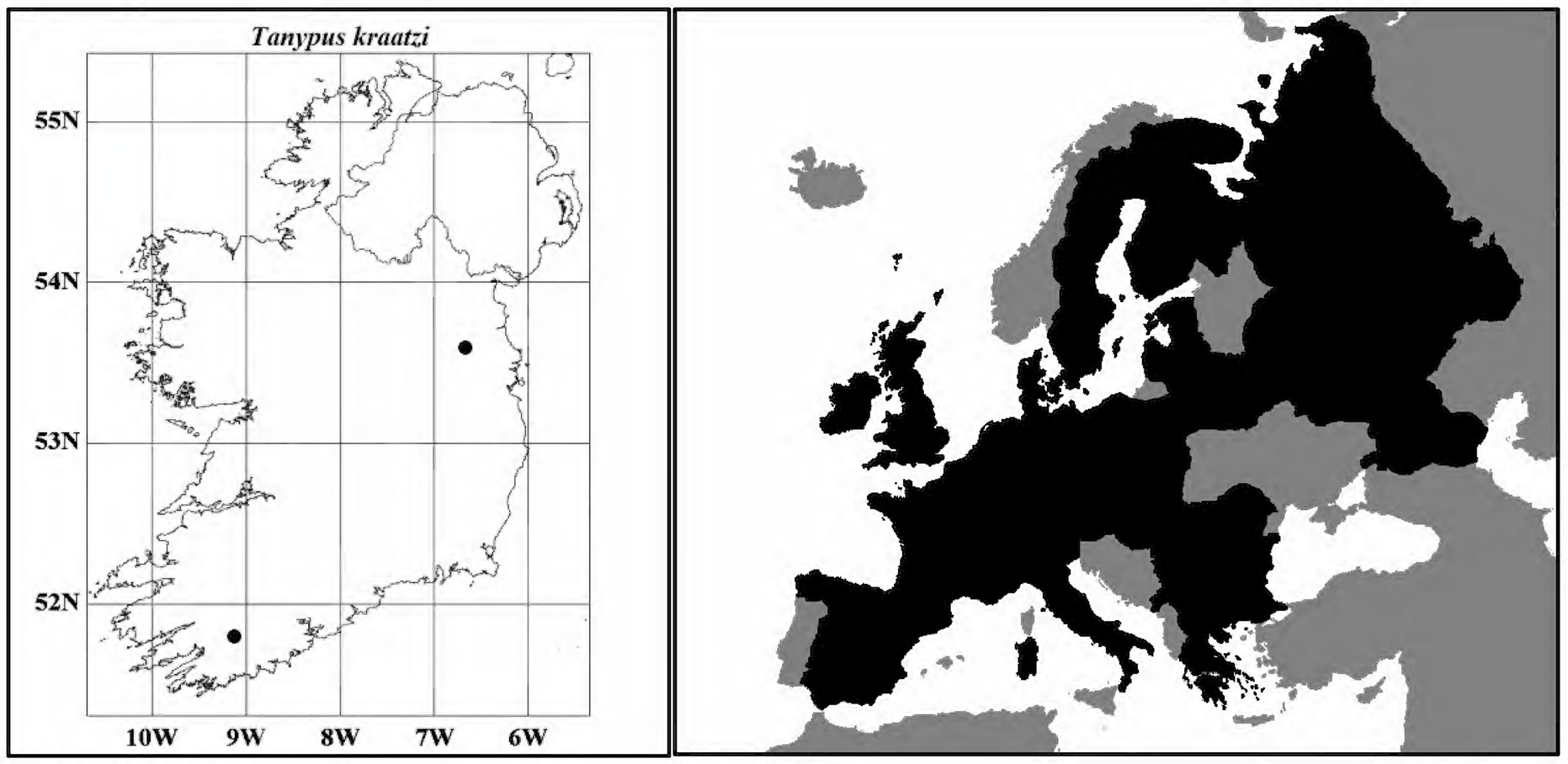
FIGURES 81-82. *Rheopelopia eximia* (Edwards, 1929).



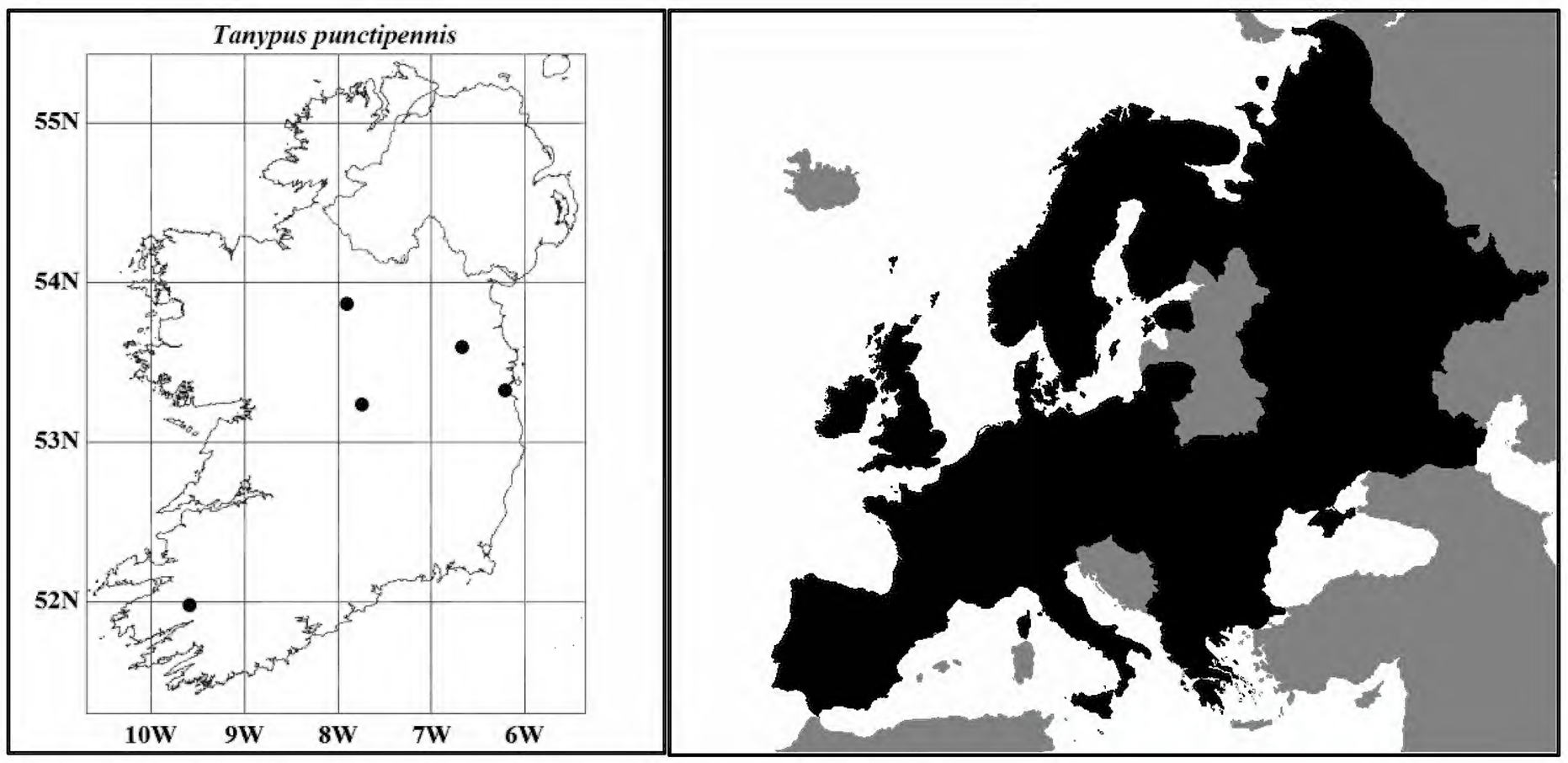
FIGURES 83-84. *Rheopelopia maculipennis* (Zetterstedt, 1838).



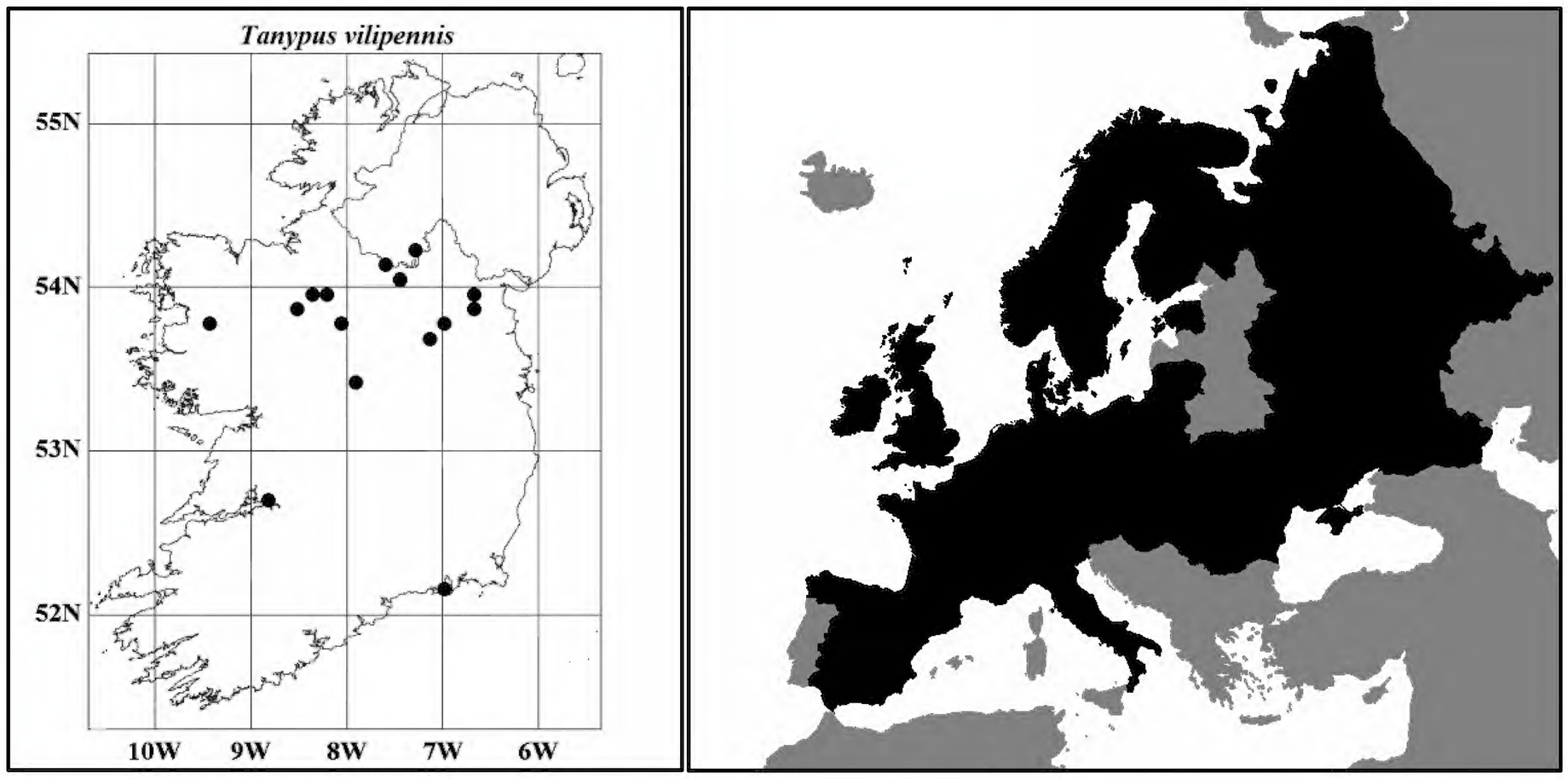
FIGURES 85-86. *Rheopelopia ornata* (Meigen, 1838).



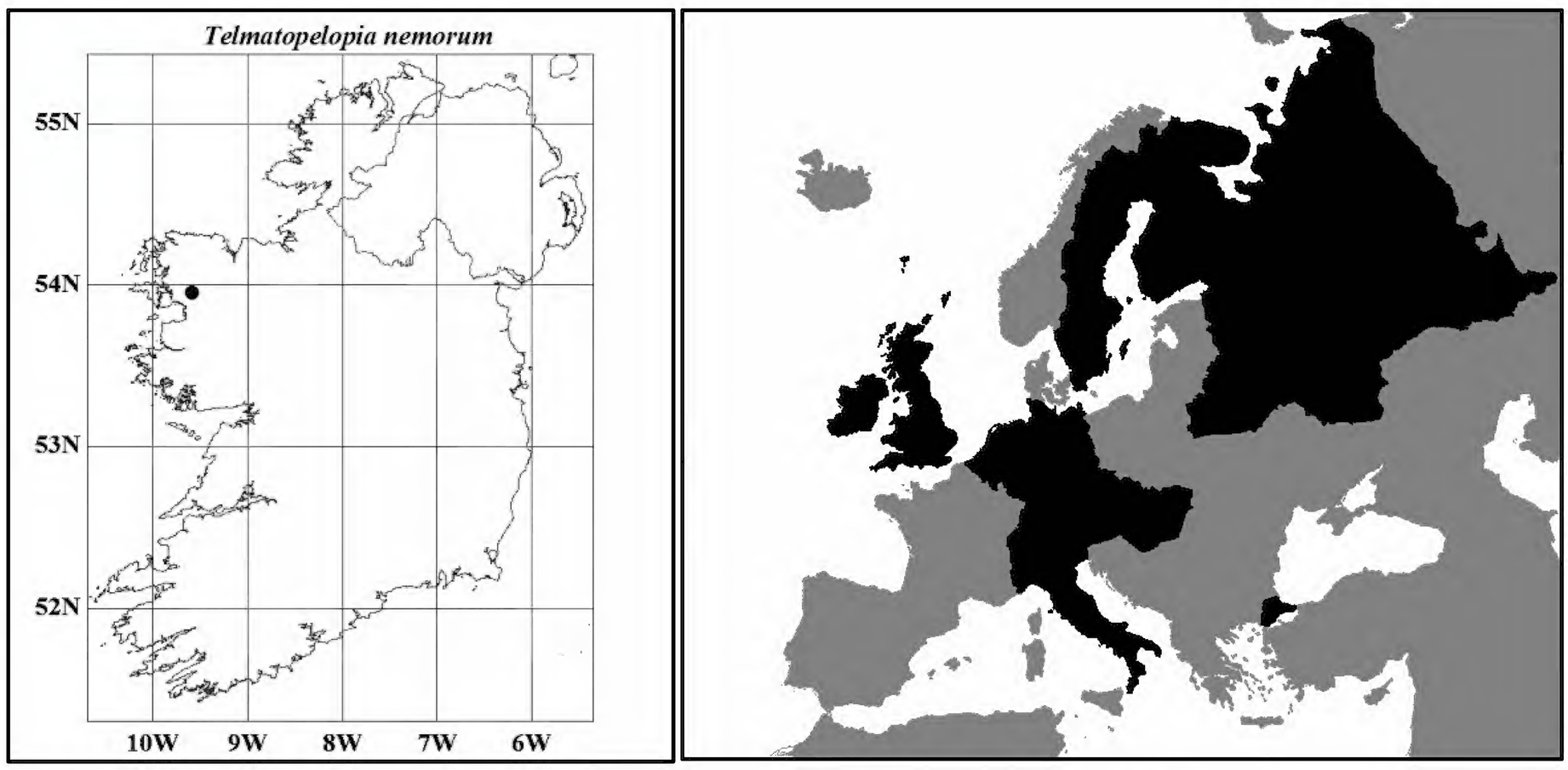
FIGURES 87-88. *Tanypus kraatzi* (Kieffer, 1912).



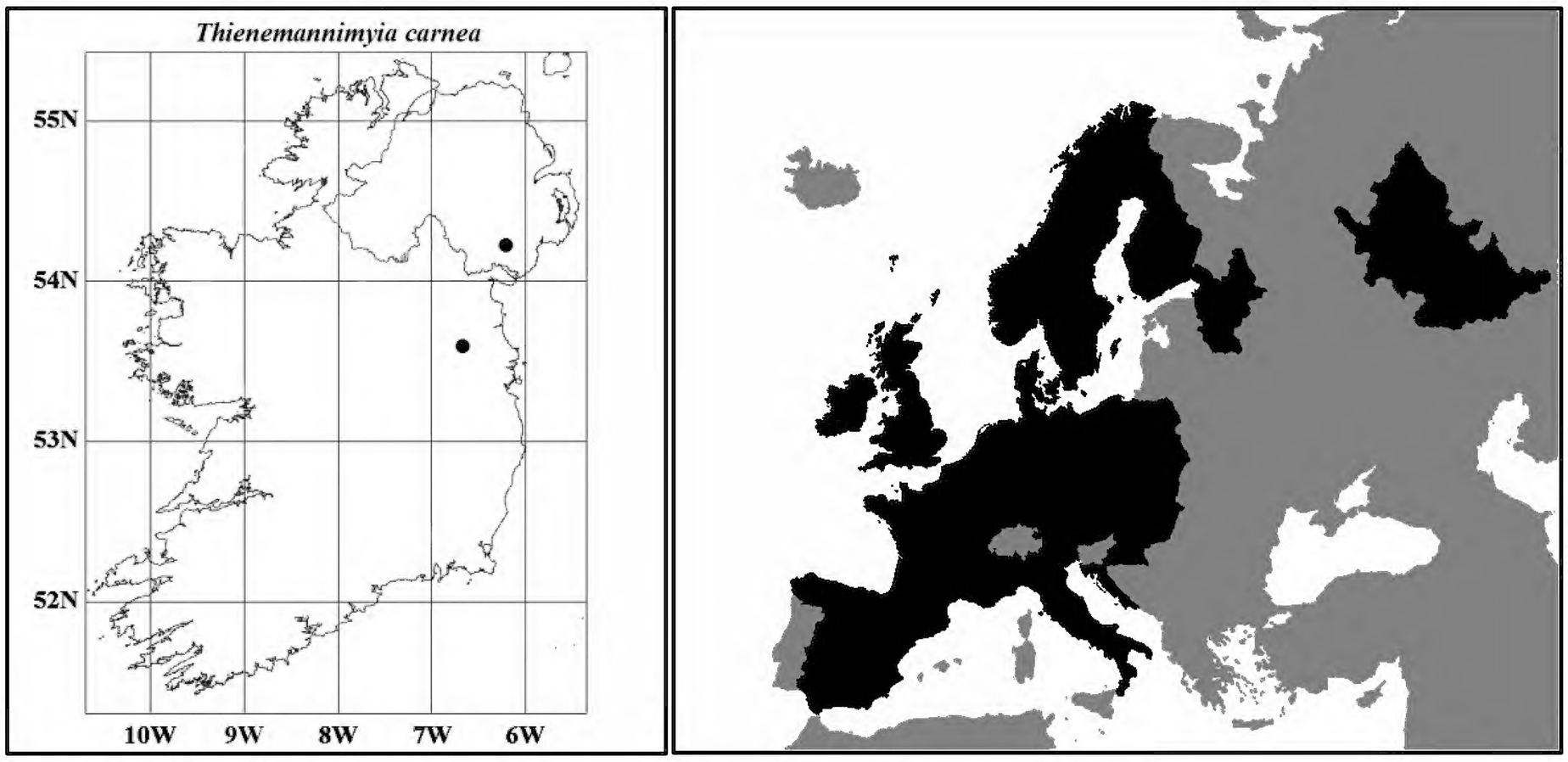
FIGURES 89-90. *Tanypus punctipennis* Meigen, 1818.



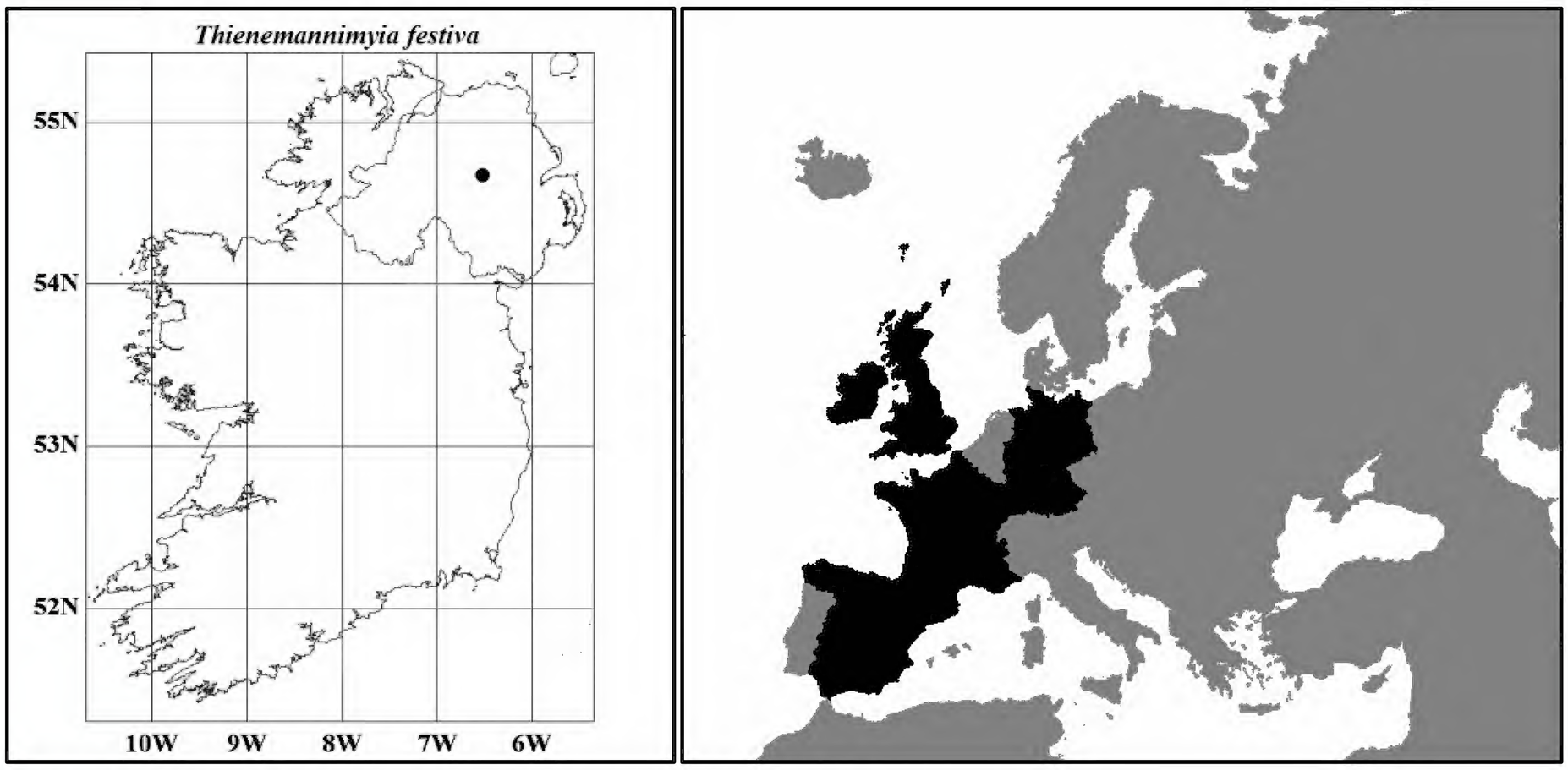
FIGURES 91-92. *Tanypus vilipennis* (Kieffer, 1918).



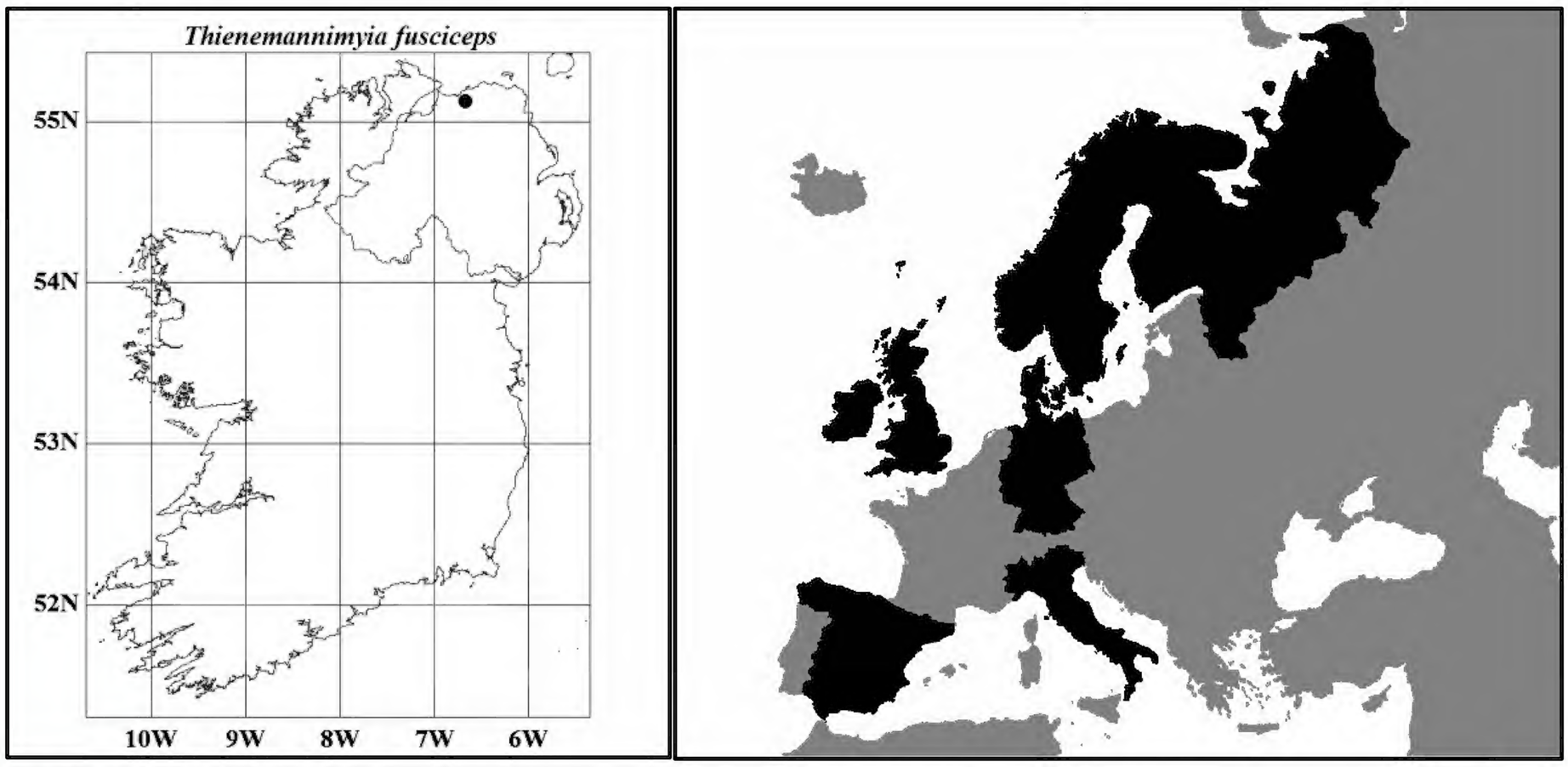
FIGURES 93-94. *Telmatopelopia nemorum* (Goetghebuer, 1921).



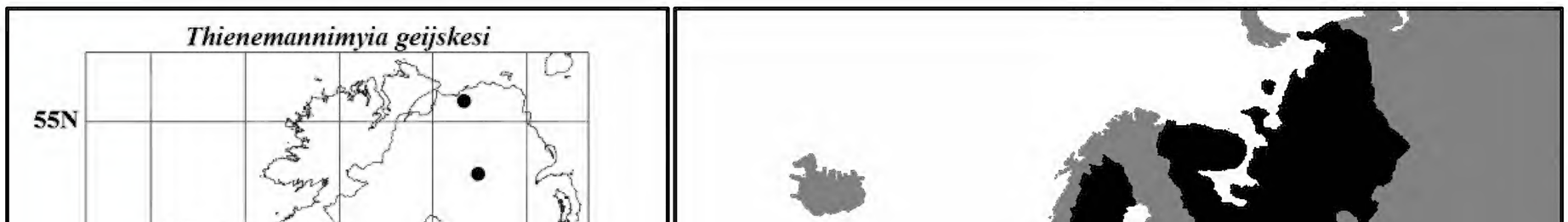
FIGURES 95-96. *Thienemannimyia carnea* (Fabricius, 1805).



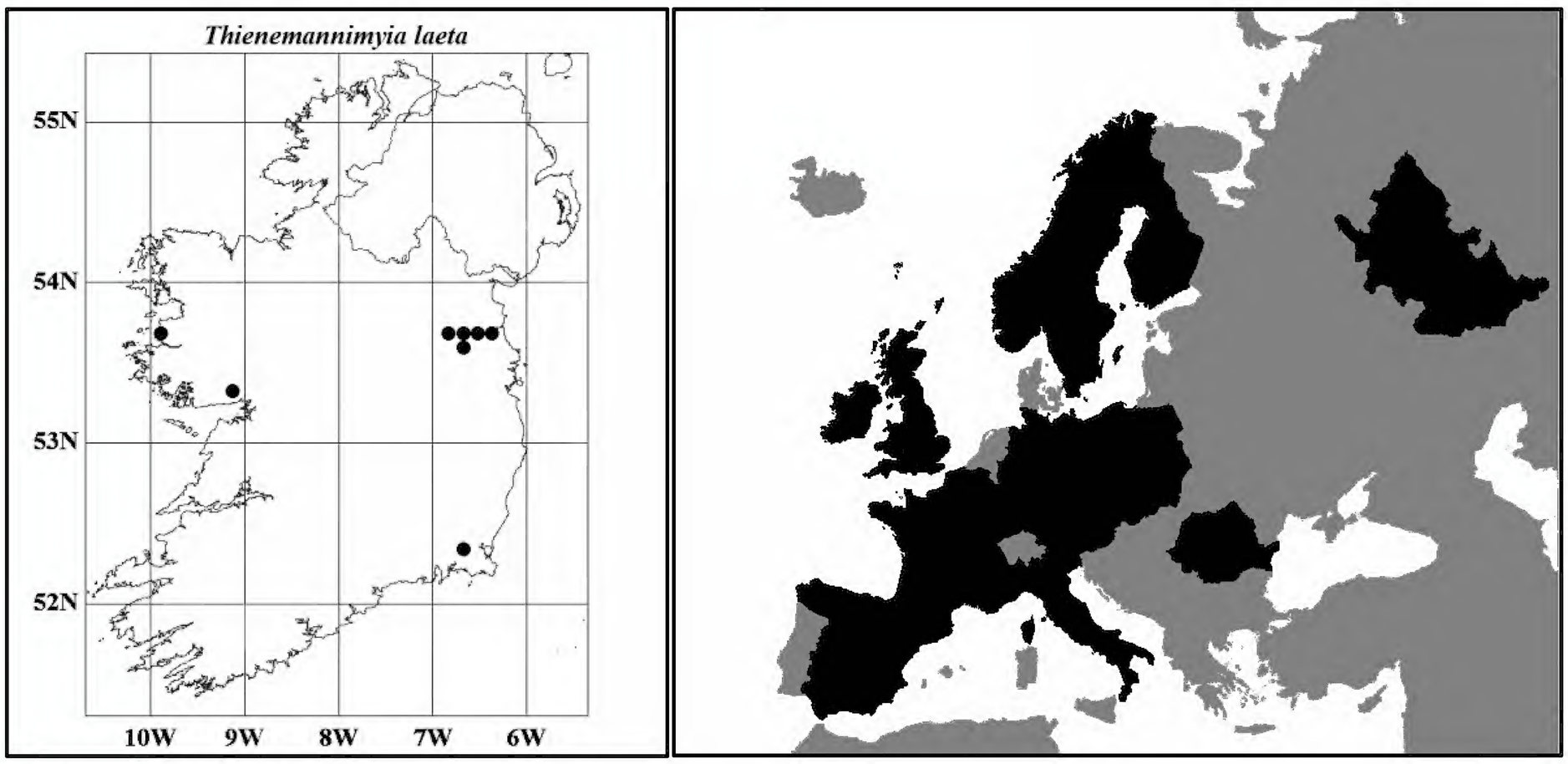
FIGURES 97-98. *Thienemannimyia festiva* (Meigen, 1838).



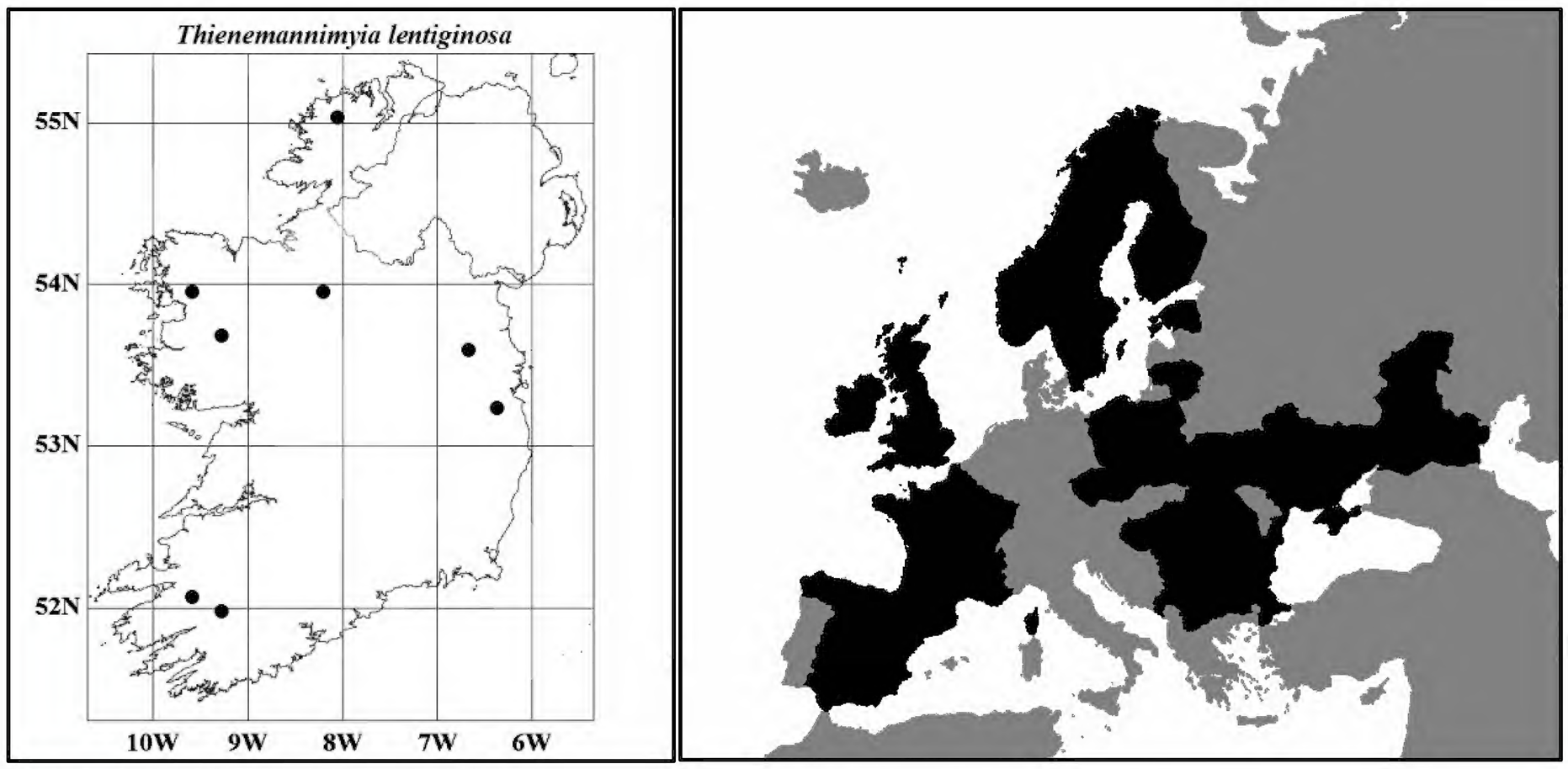
FIGURES 99-100. *Thienemannimyia fusciceps* (Edwards, 1929).



FIGURES 101-102. *Thienemannimyia geijskesi* (Goetghebuer, 1934).

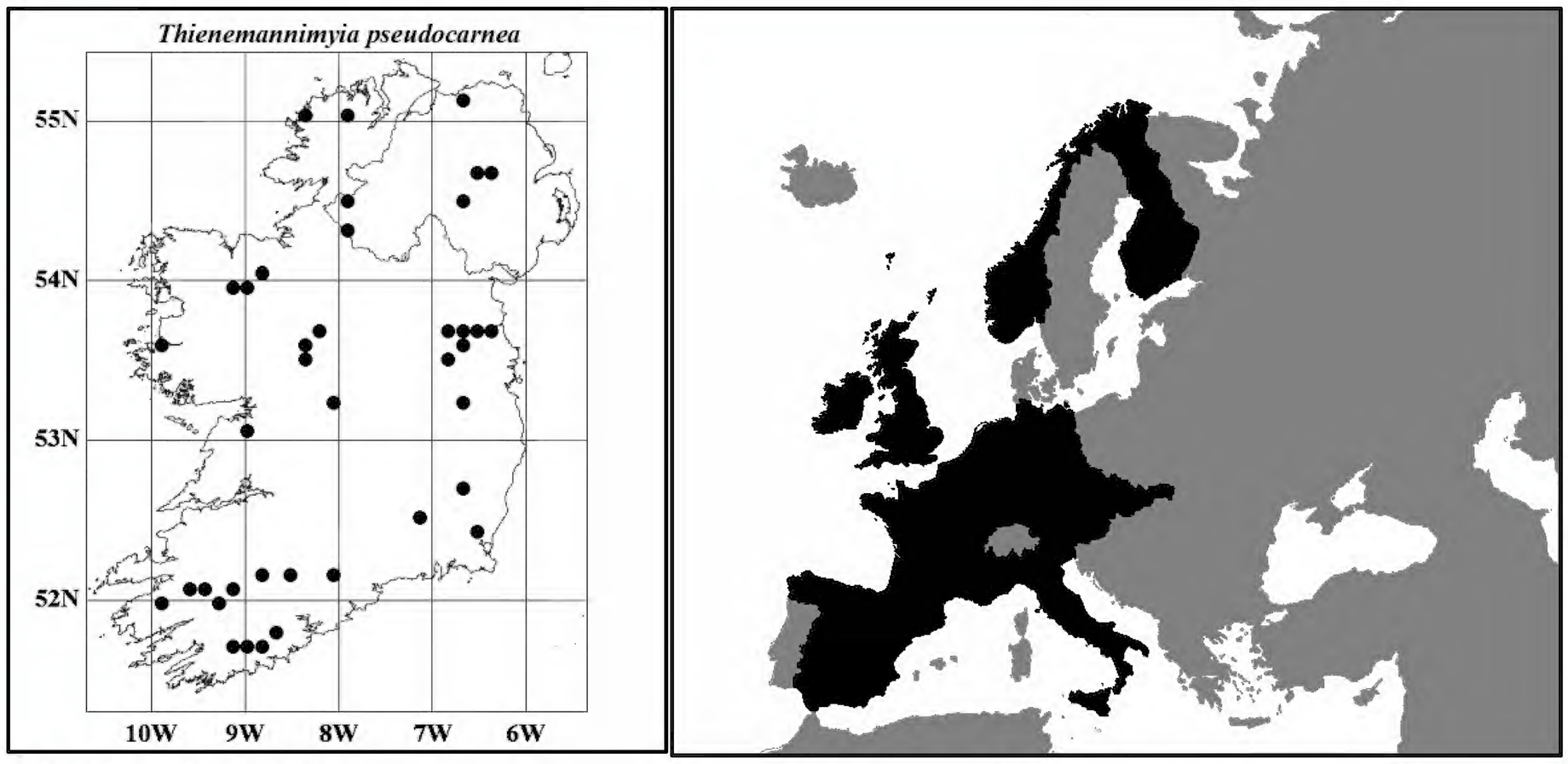


FIGURES 103-104. *Thienemannimyia laeta* (Meigen, 1818).

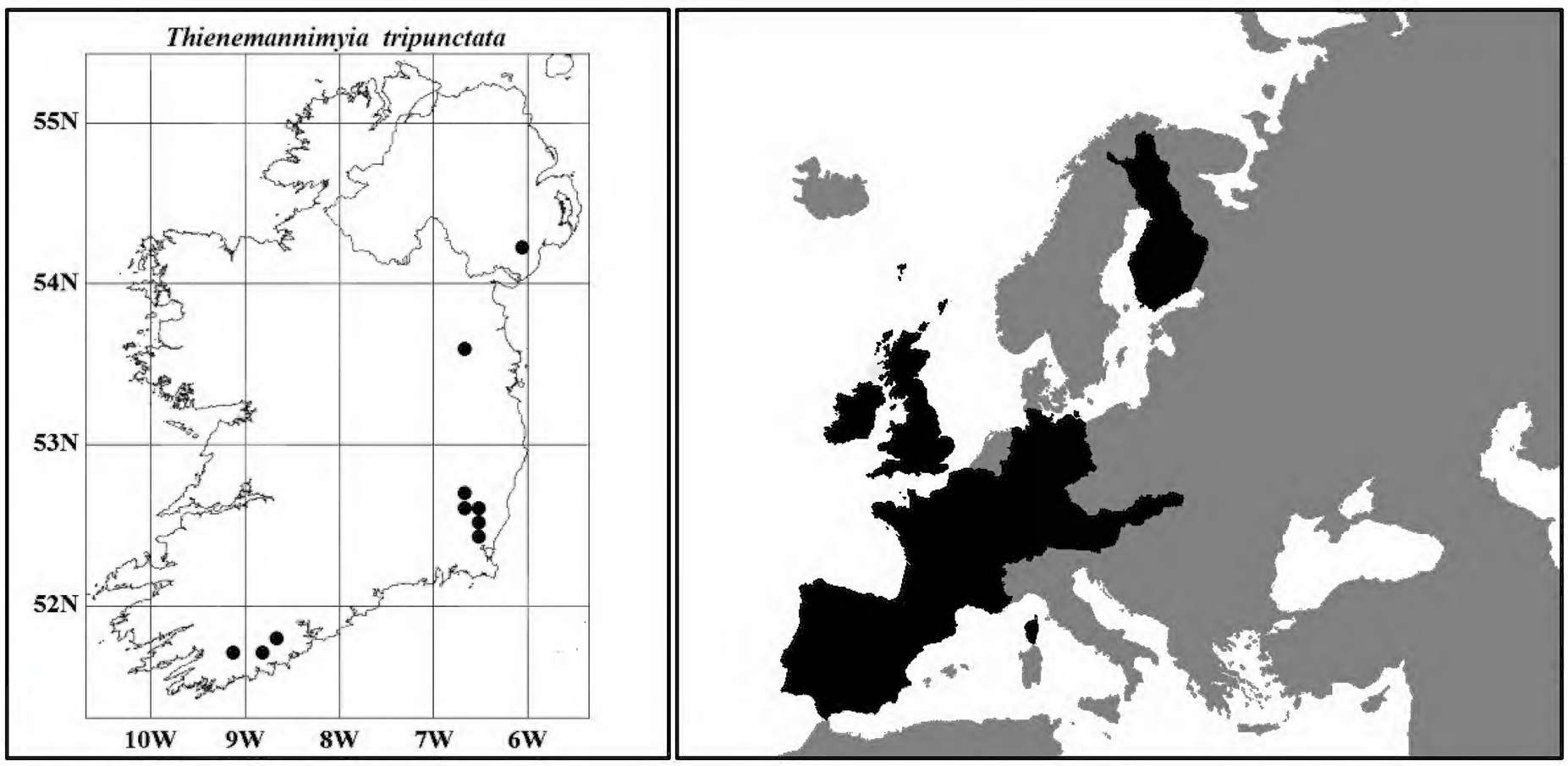


FIGURES 105-106. *Thienemannimyia lentiginosa* (Fries, 1823).

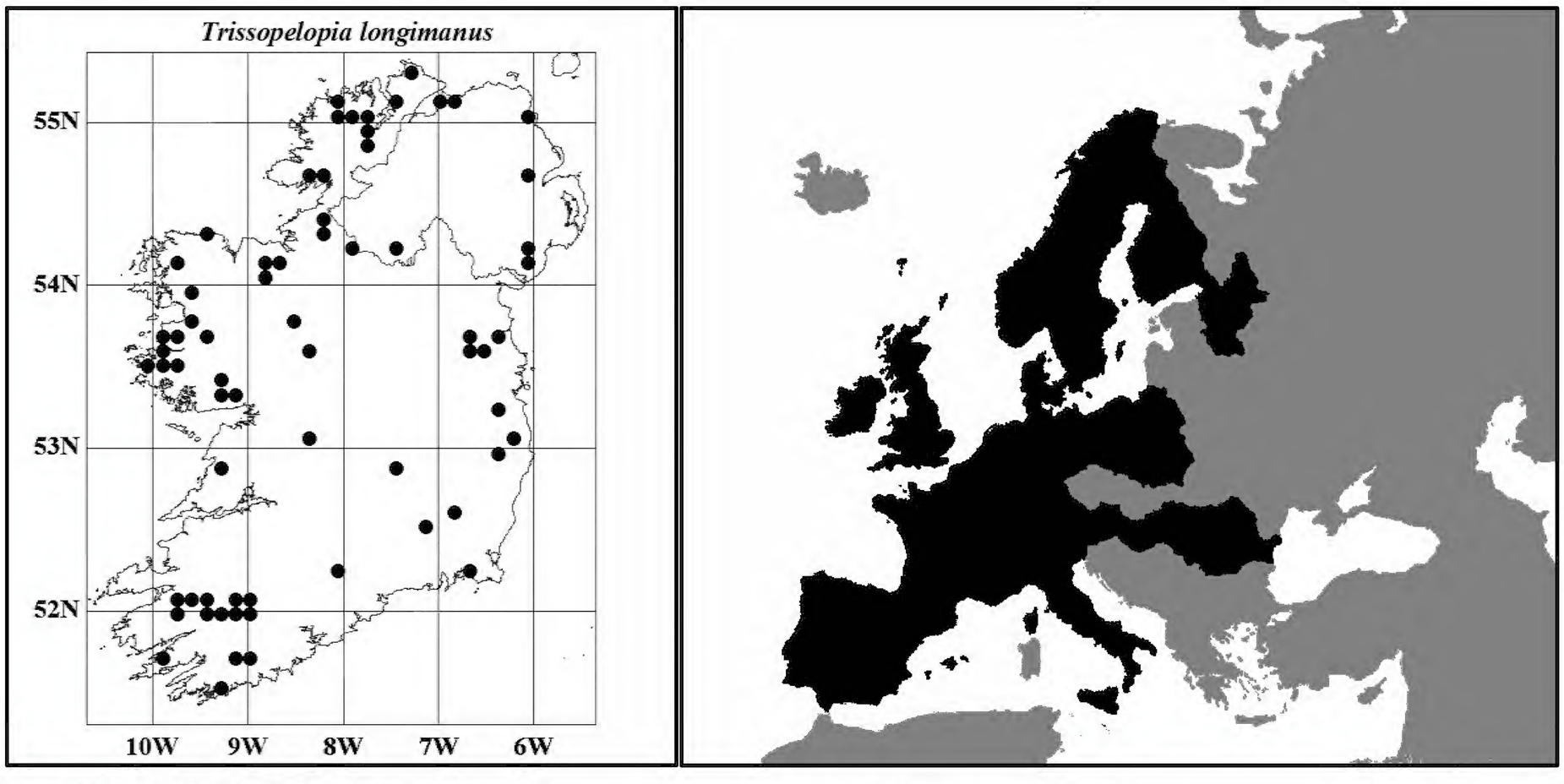
FIGURES 107-108. *Thienemannimyia northumbrica* (Edwards, 1929).



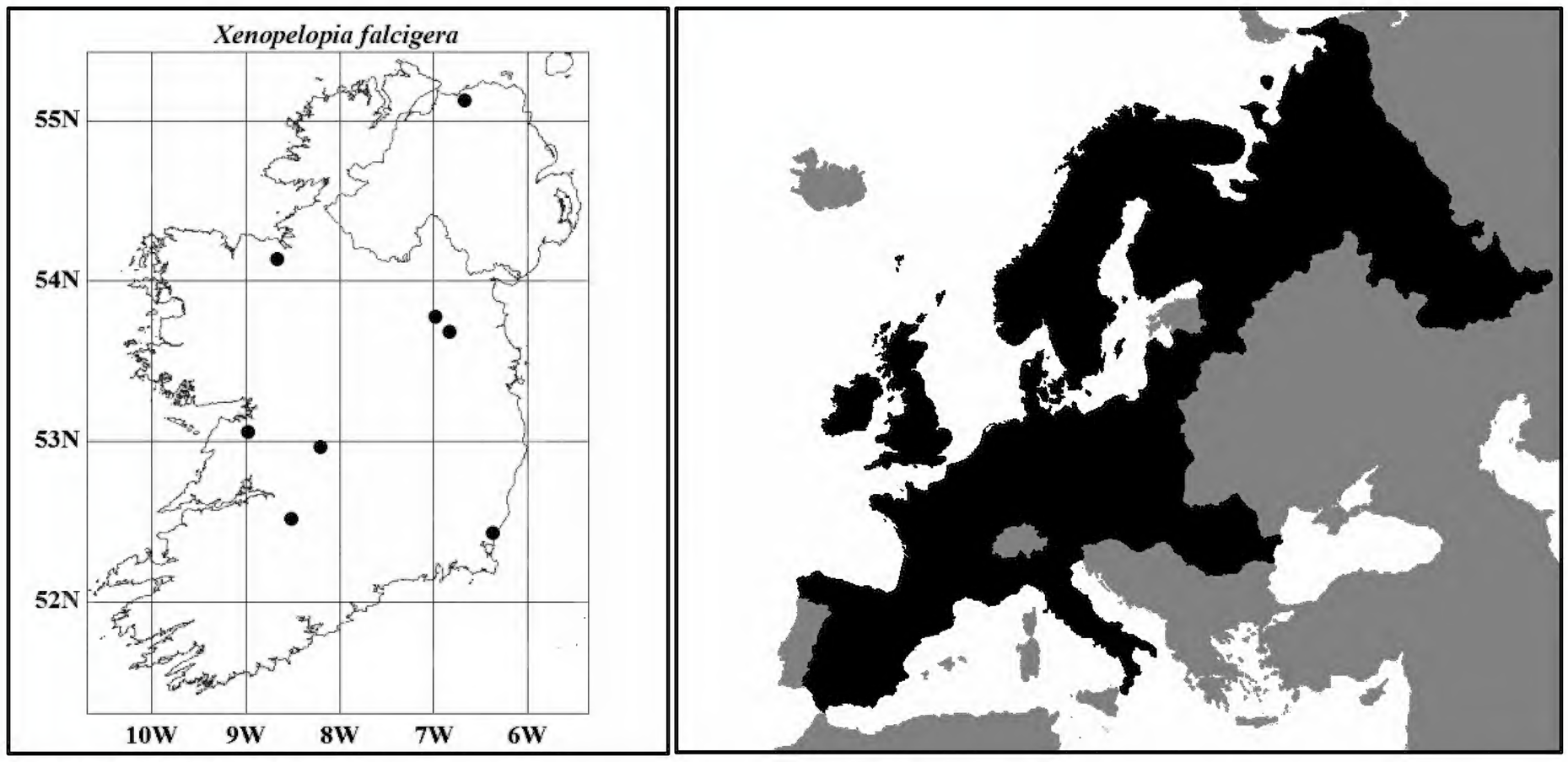
FIGURES 109-110. *Thienemannimyia pseudocarnea* Murray, 1976.



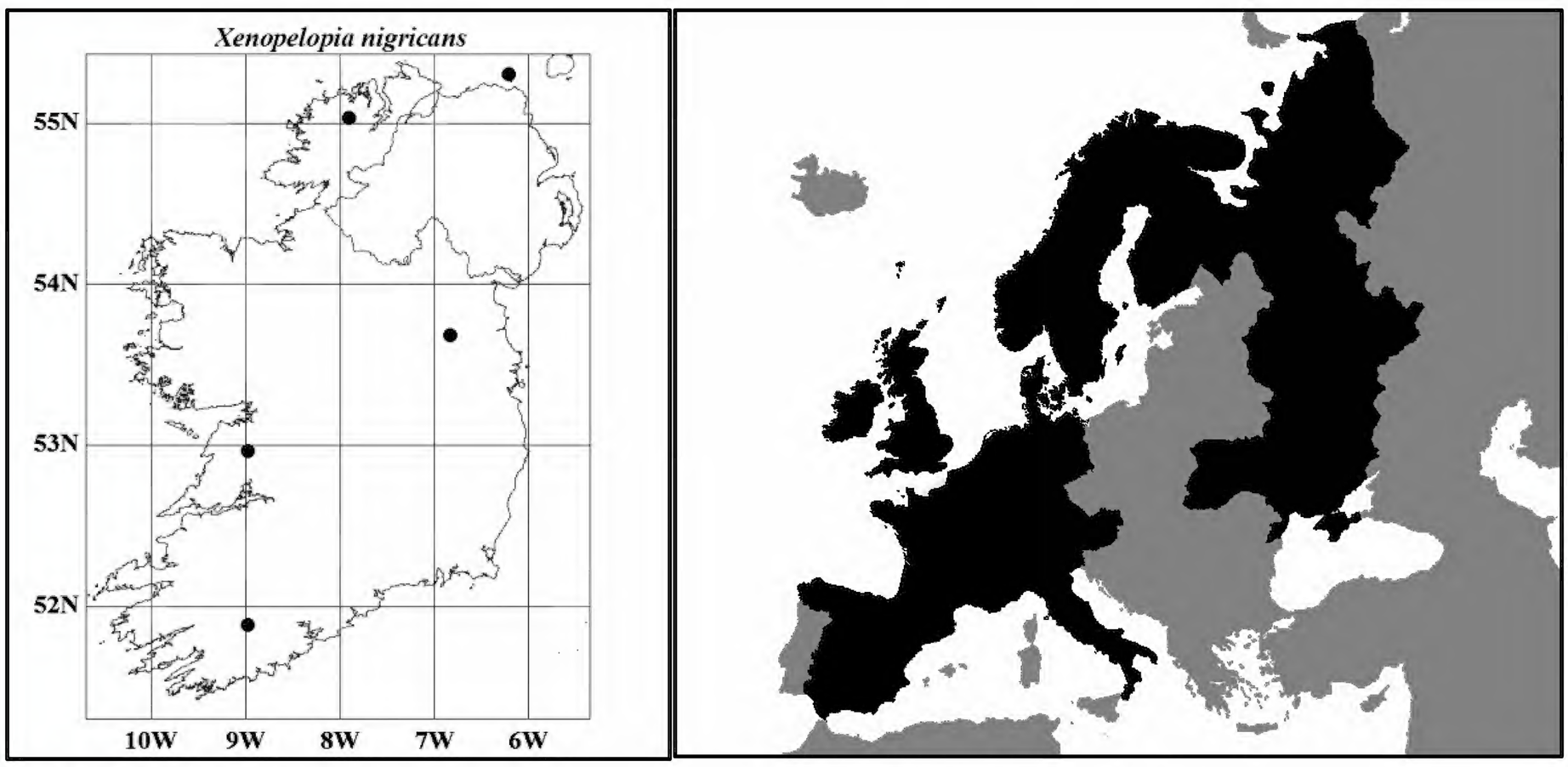
FIGURES 111-112. *Thienemannimyia tripunctata* (Goetghebuer, 1922).



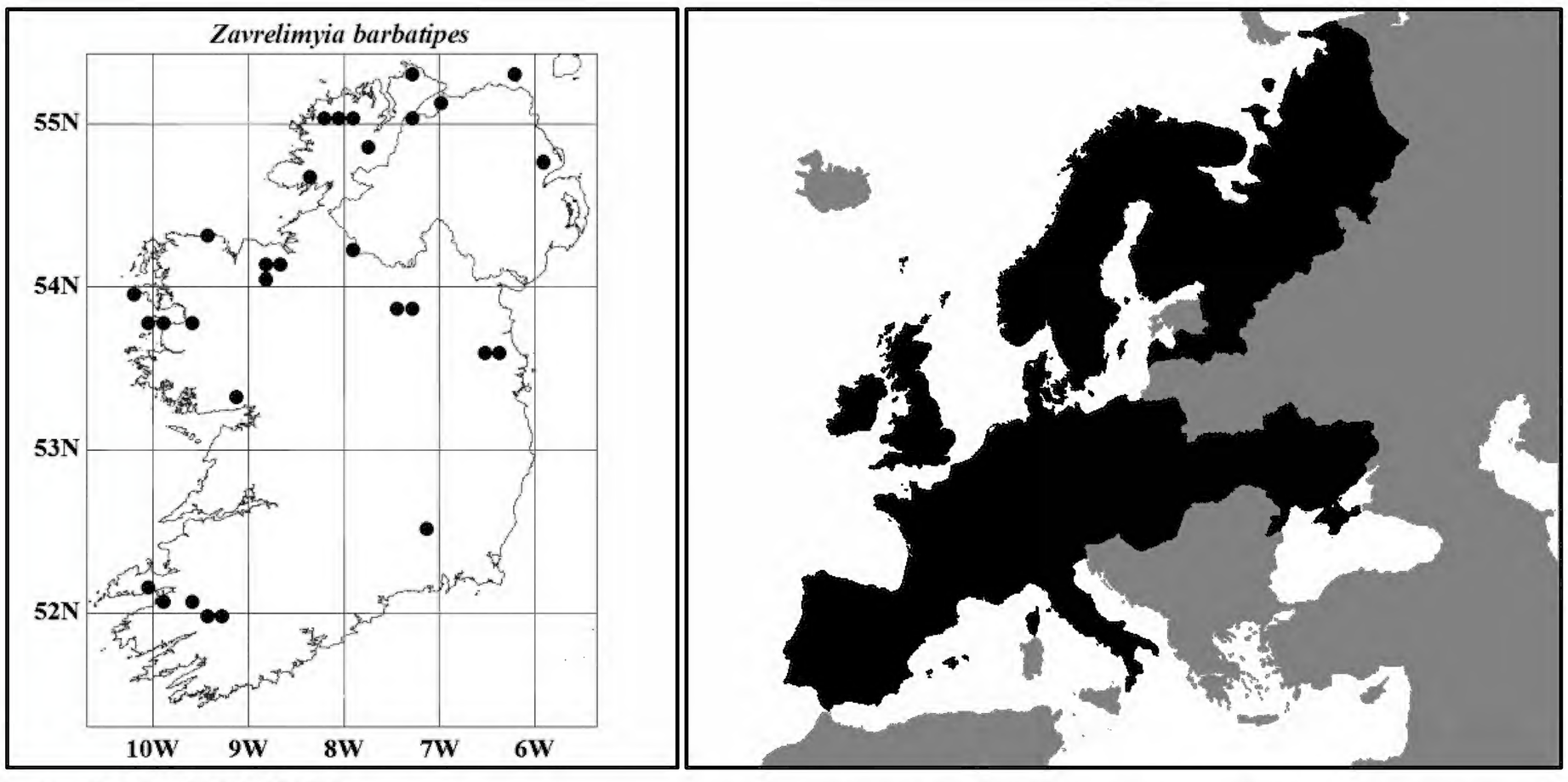
FIGURES 113-114. *Trissopelopia longimanus* (Staeger, 1839).



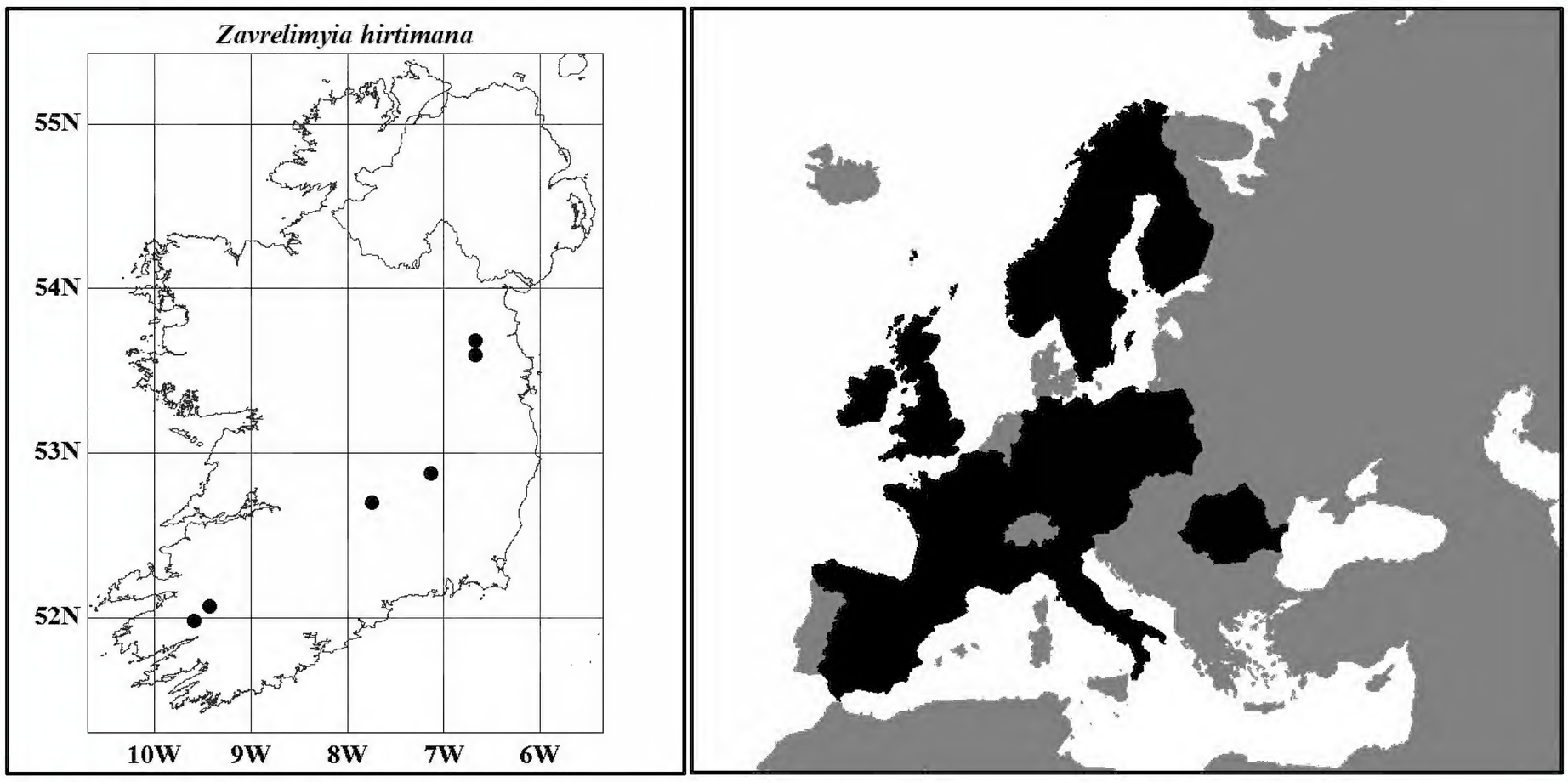
FIGURES 115-116. *Xenopelopia falcigera* (Kieffer, 1911).



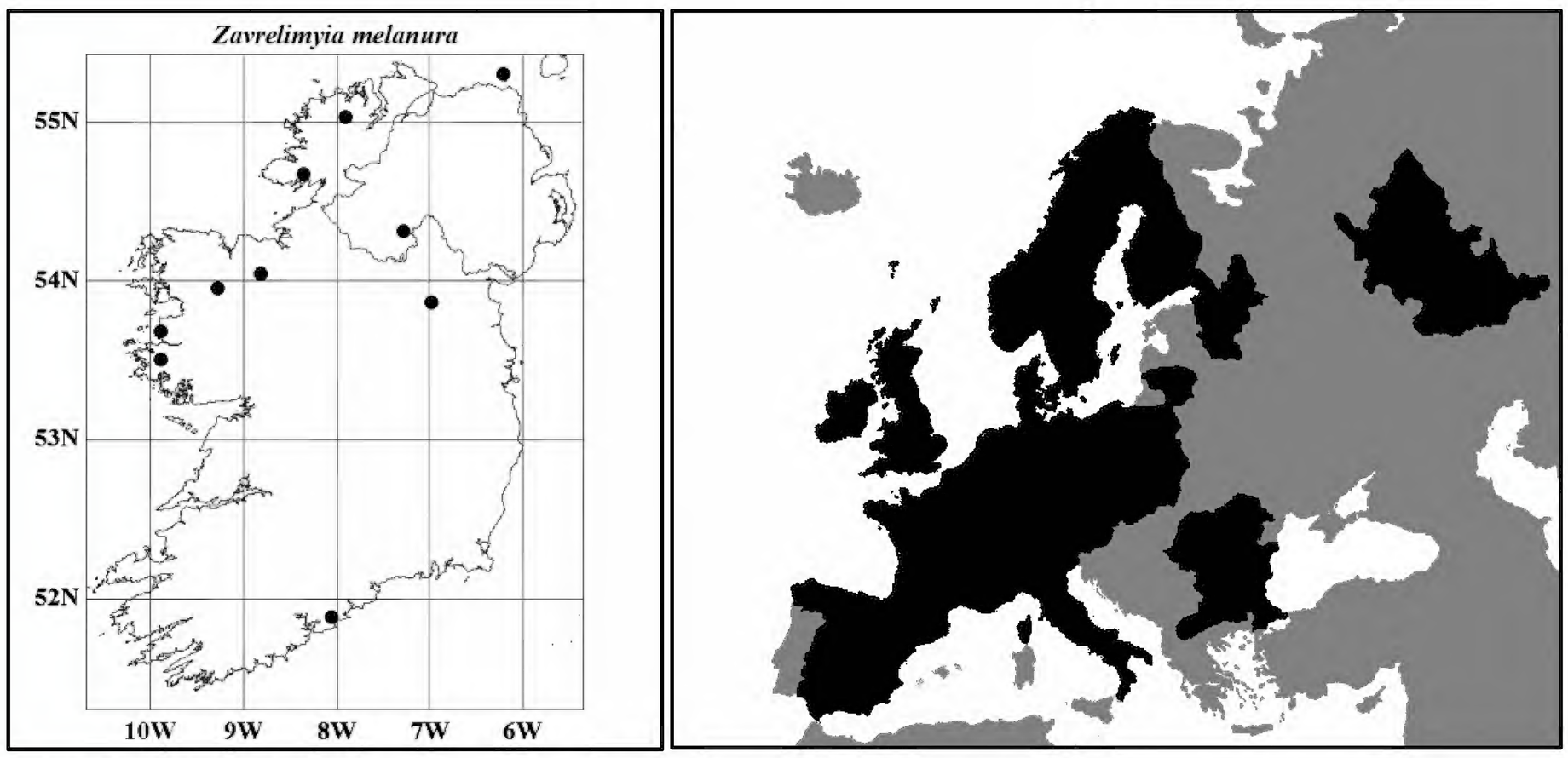
FIGURES 117-118. *Xenopelopia nigricans* (Goetghebuer, 1927).



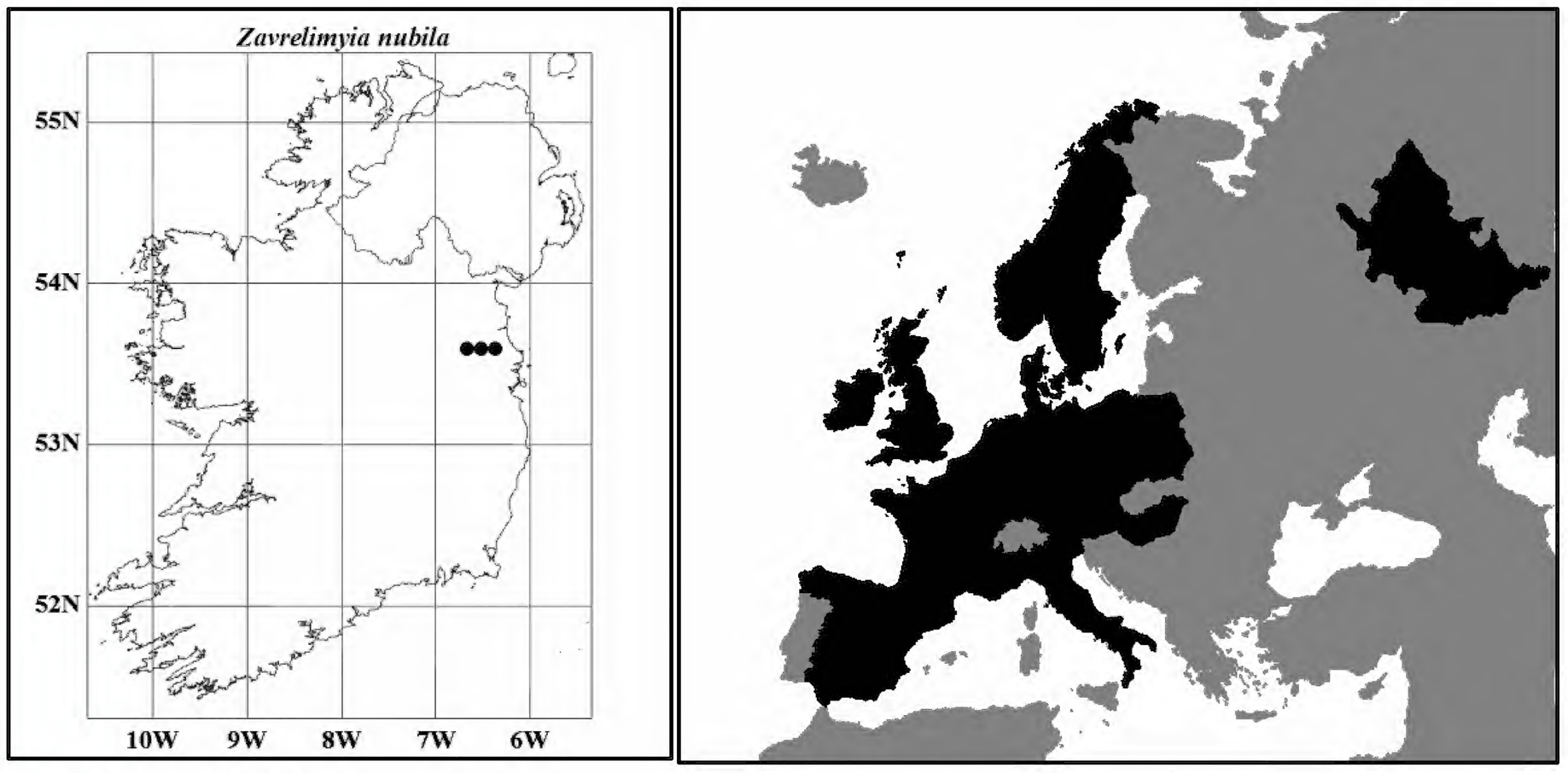
FIGURES 119-120. *Zavrelimyia barbatipes* (Kieffer, 1911). See also pages 208-209.



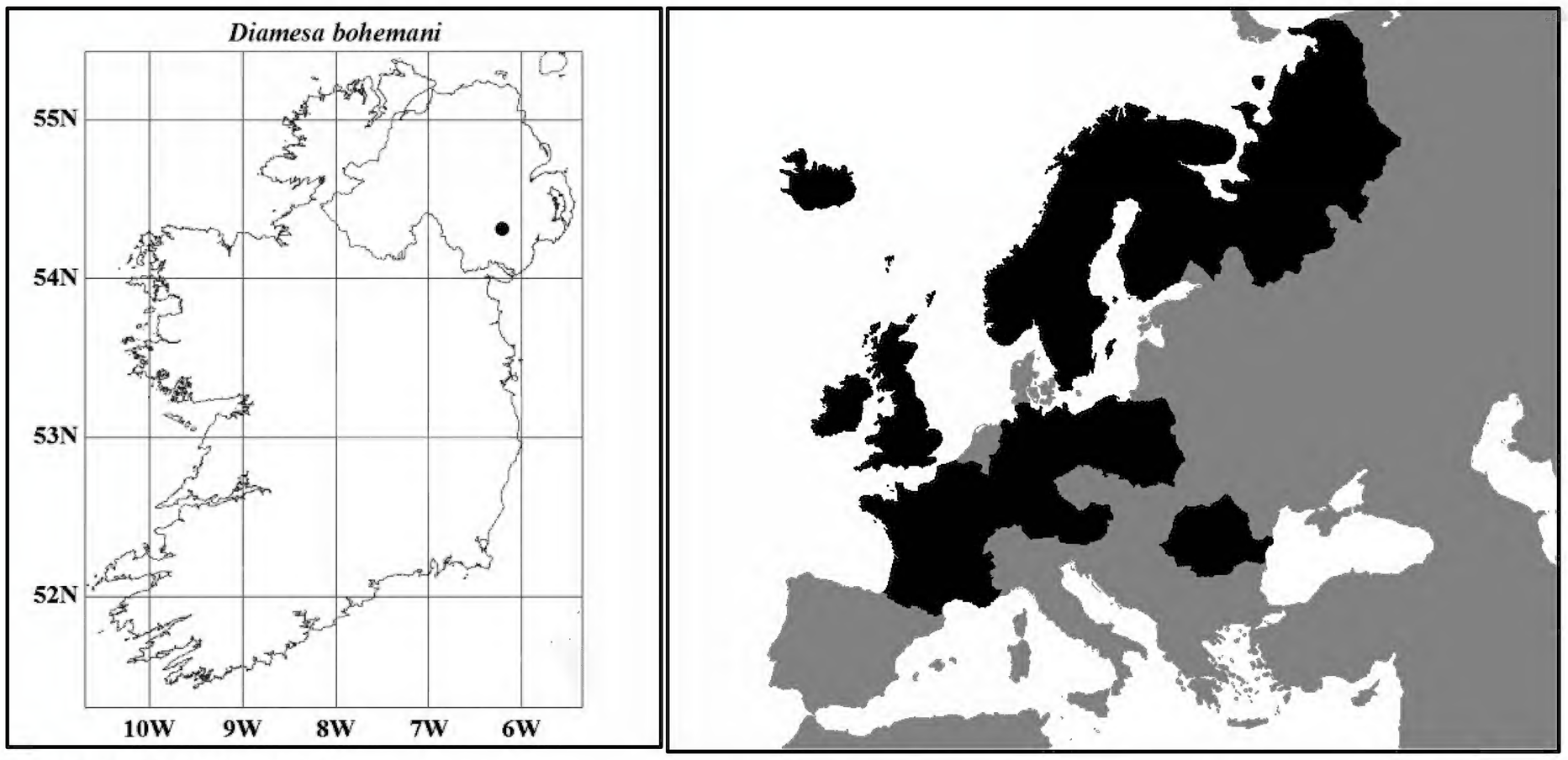
FIGURES 121-122. *Zavrelimyia hirtimanus* (Kieffer, 1918). See also pages 208-209.



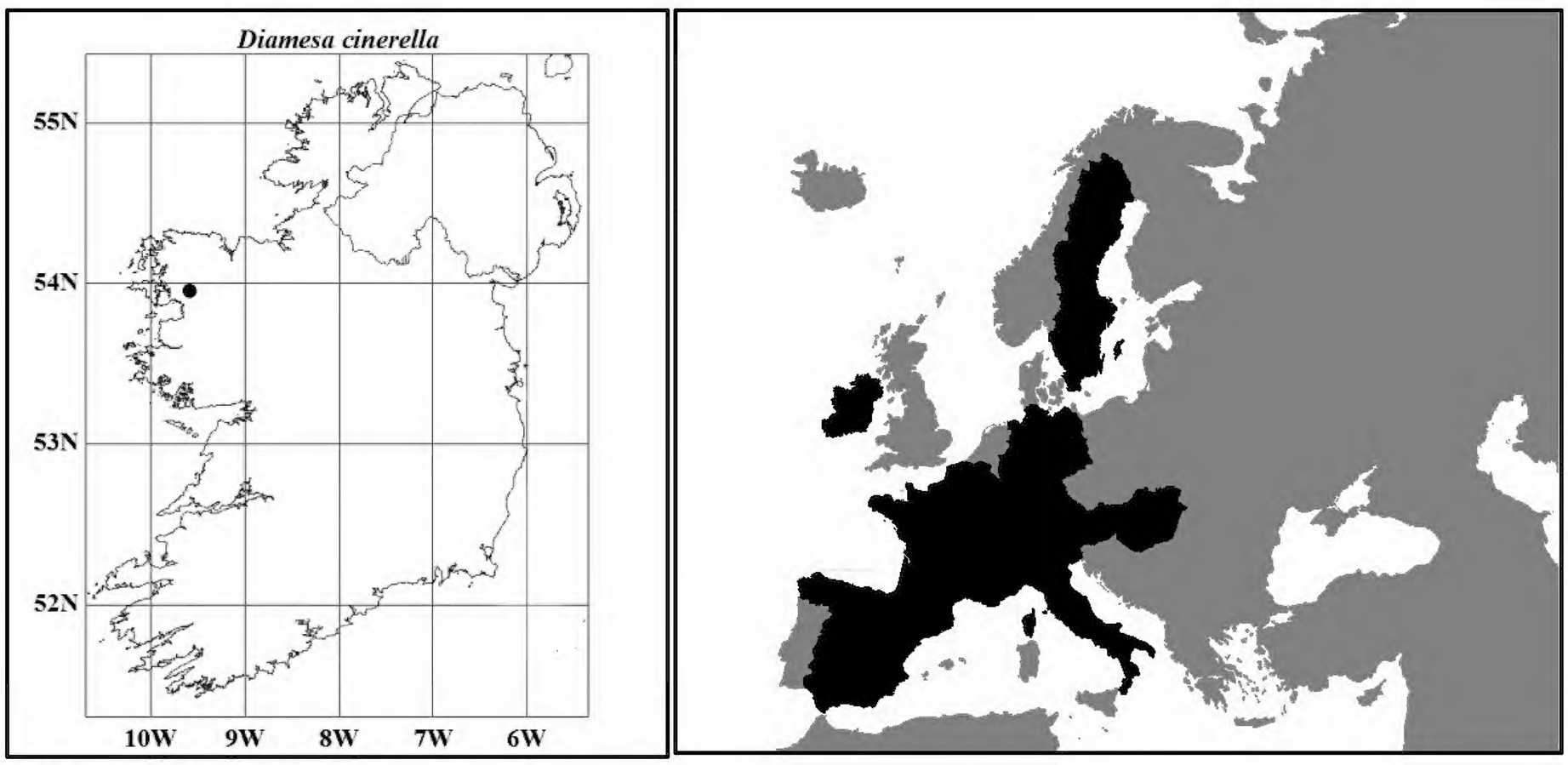
FIGURES 123-124. *Zavrelimyia melanura* (Meigen, 1804). See also pages 208-209.



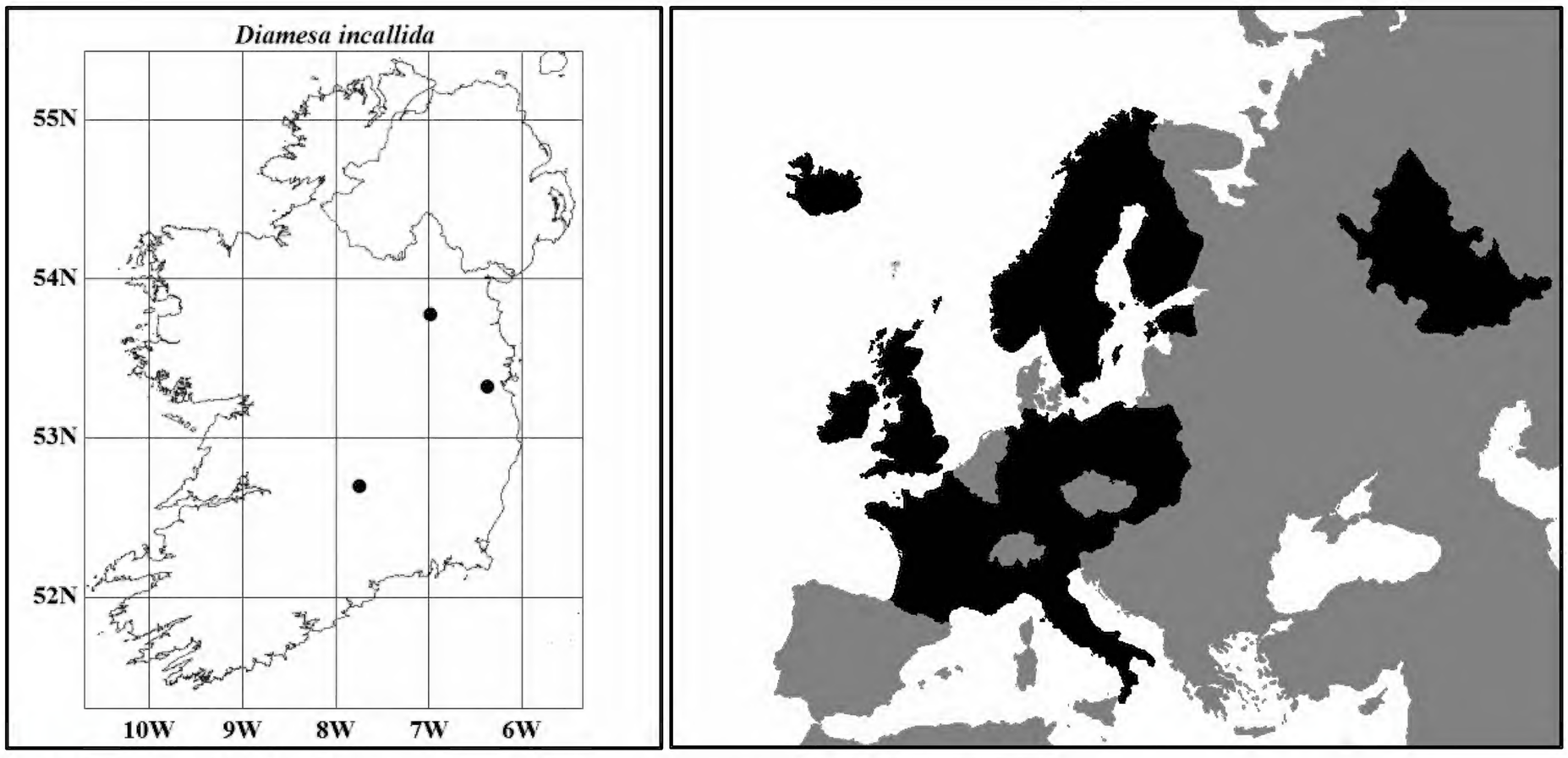
FIGURES 125-126. *Zavrelimyia nubila* (Meigen, 1830). See also pages 208-209.



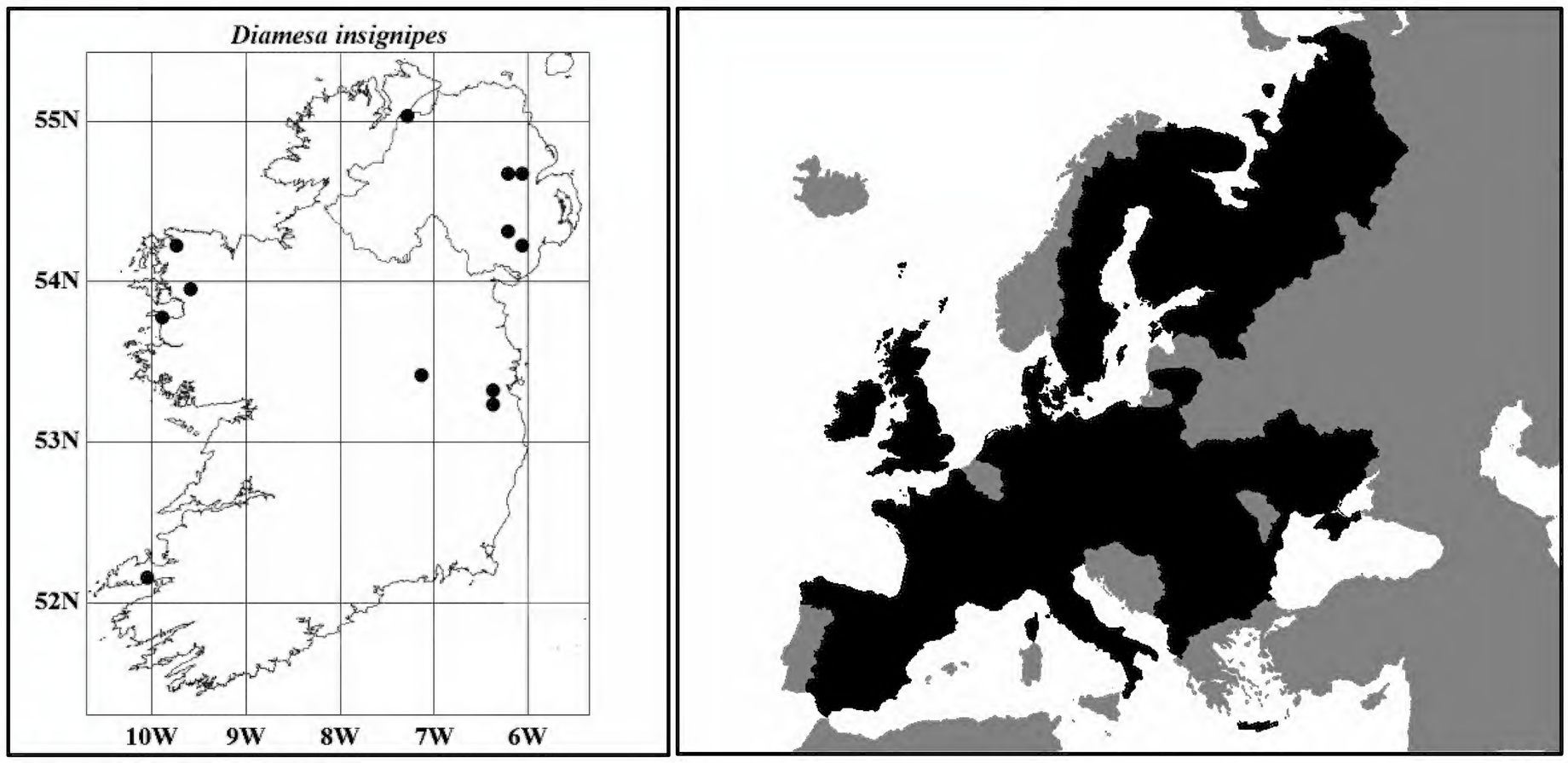
FIGURES 127-128. *Diamesa bohemani* Goetghebuer, 1932.



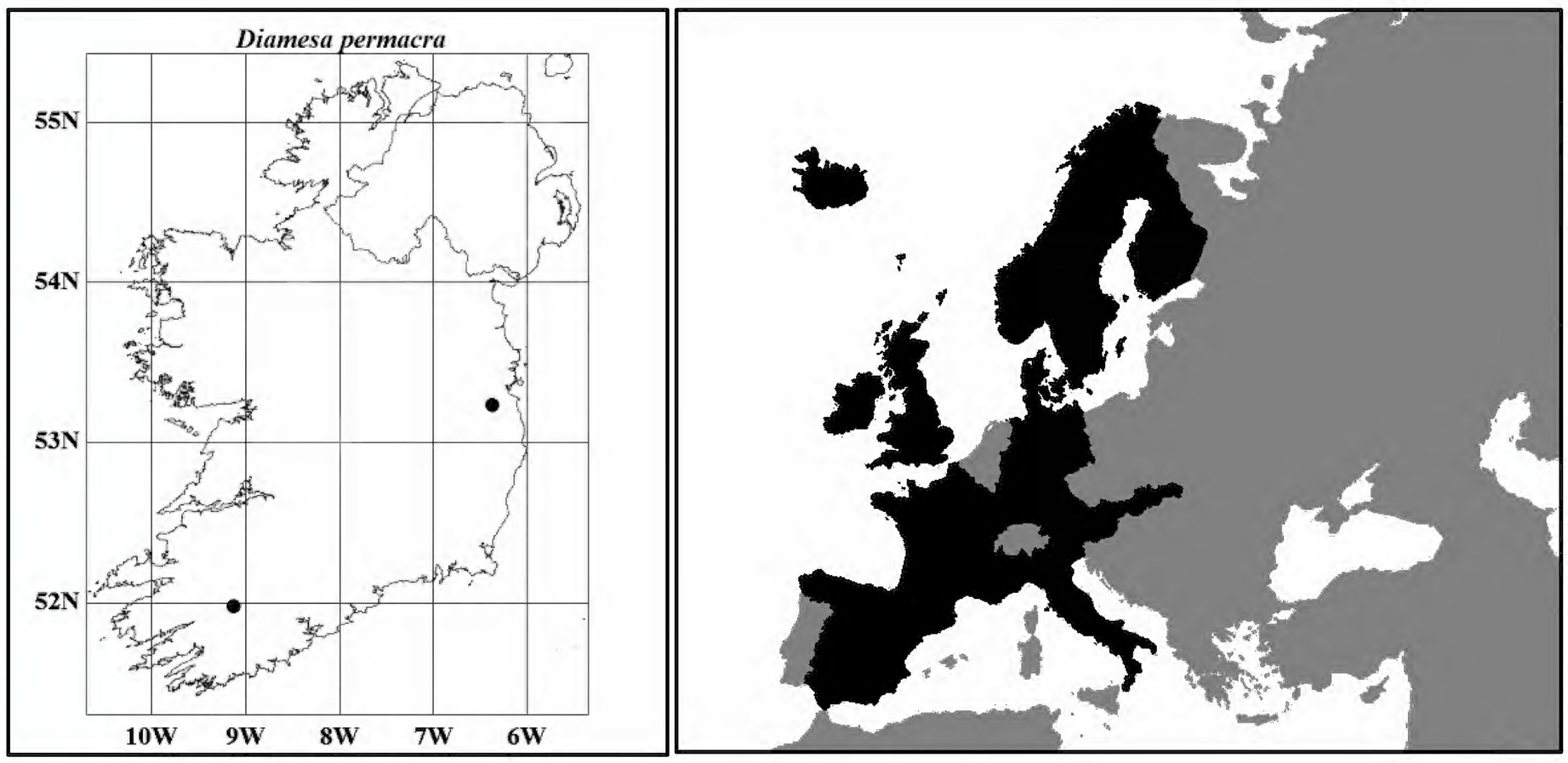
FIGURES 129-130. *Diamesa cinerella* Meigen, 1835.



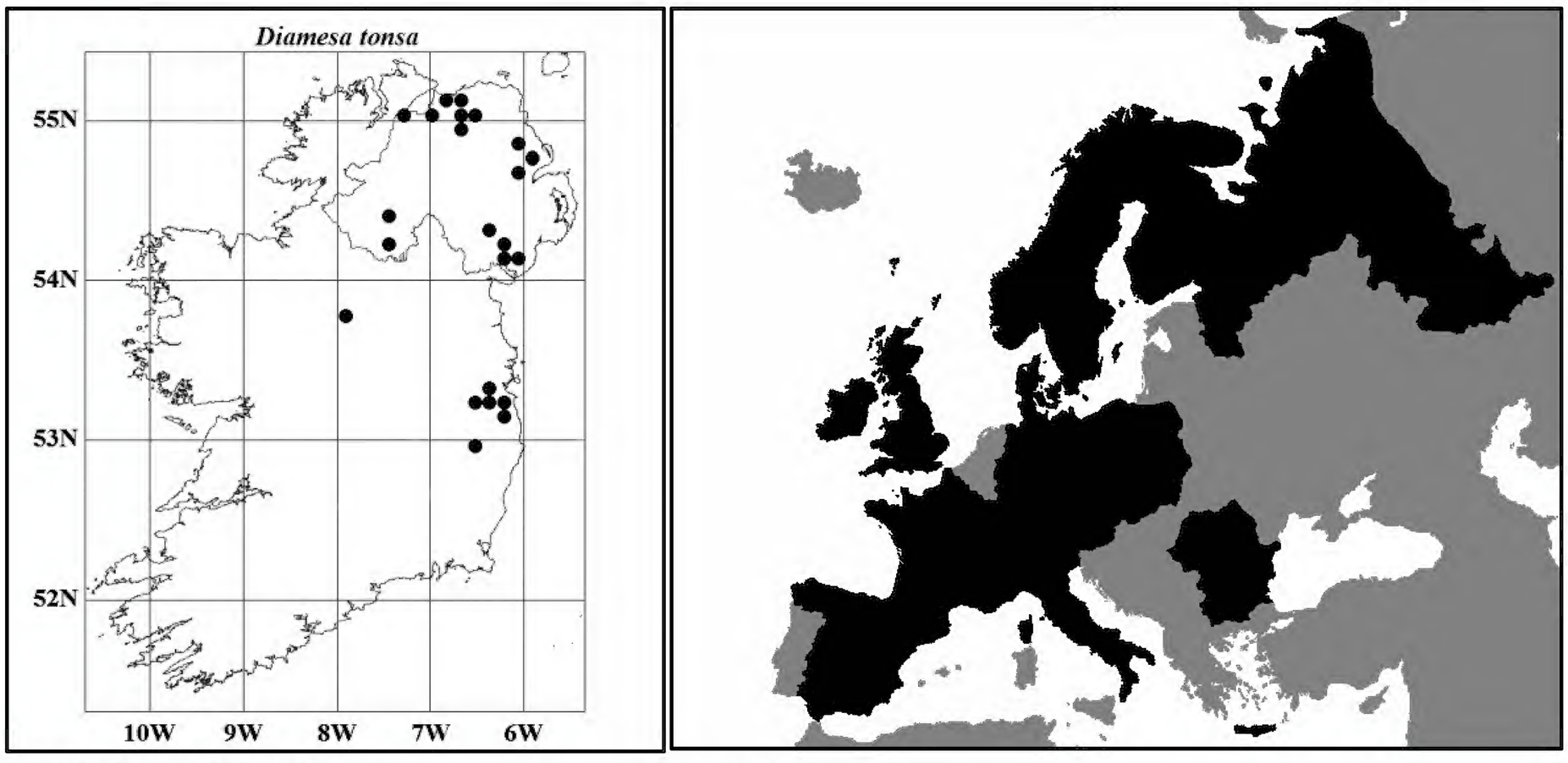
FIGURES 131-132. *Diamesa incallida* (Walker, 1856).



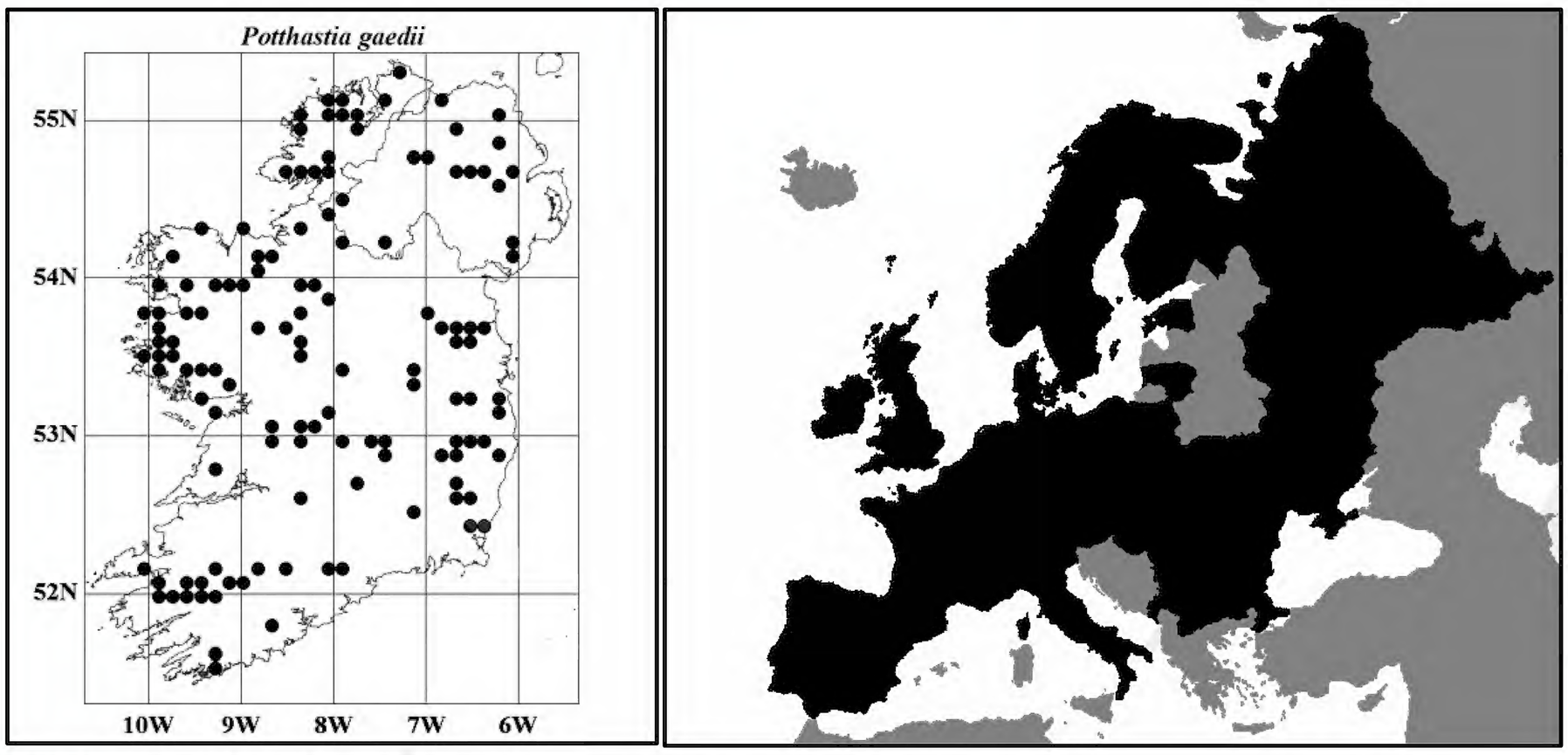
FIGURES 133-134. *Diamesa insignipes* Kieffer, 1908.



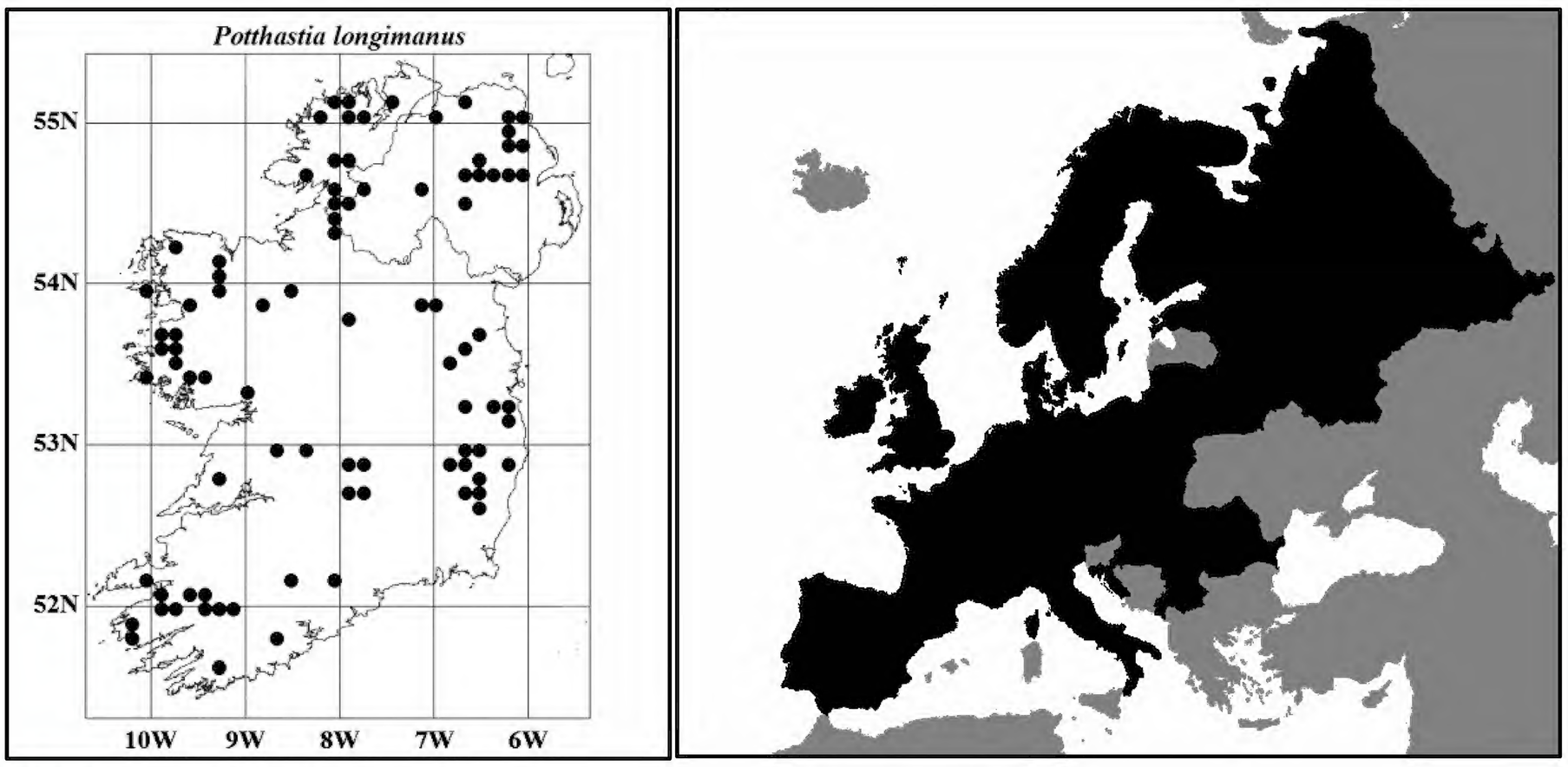
FIGURES 135-136. *Diamesa permacra* (Walker, 1856).



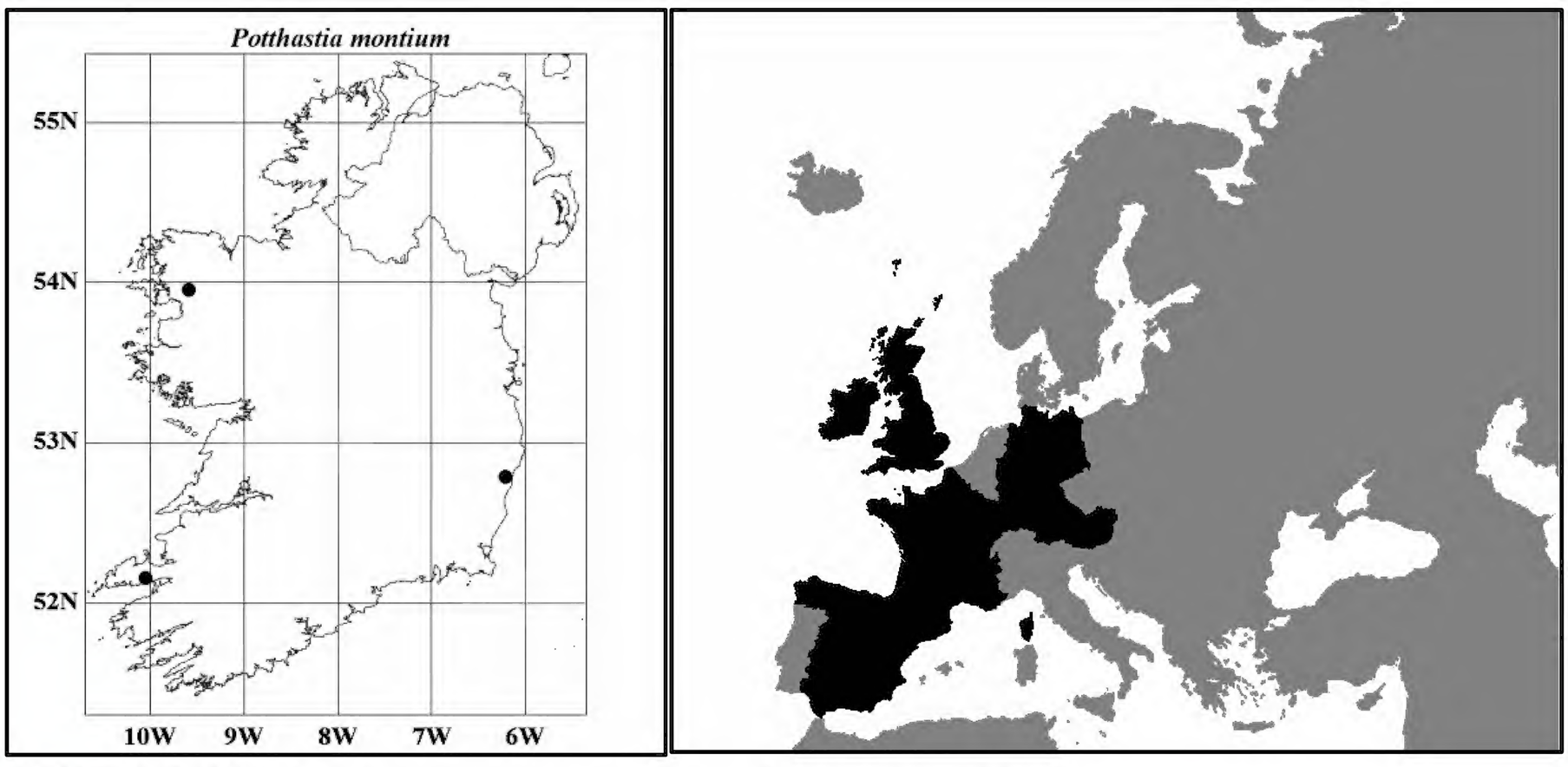
FIGURES 137-138. *Diamesa tonsa* (Haliday, 1856).



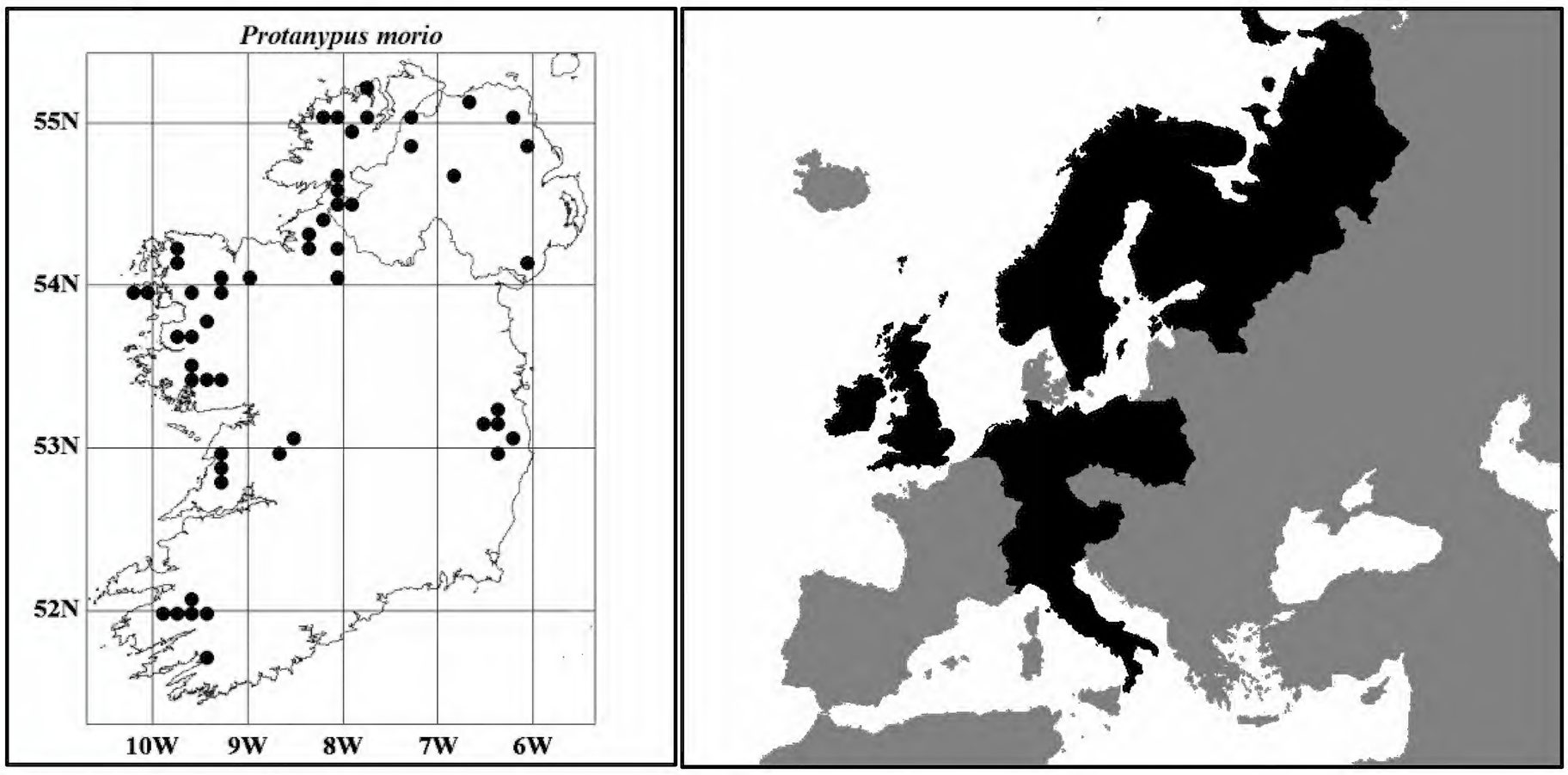
FIGURES 139-140. *Potthastia gaedii* (Meigen, 1838).



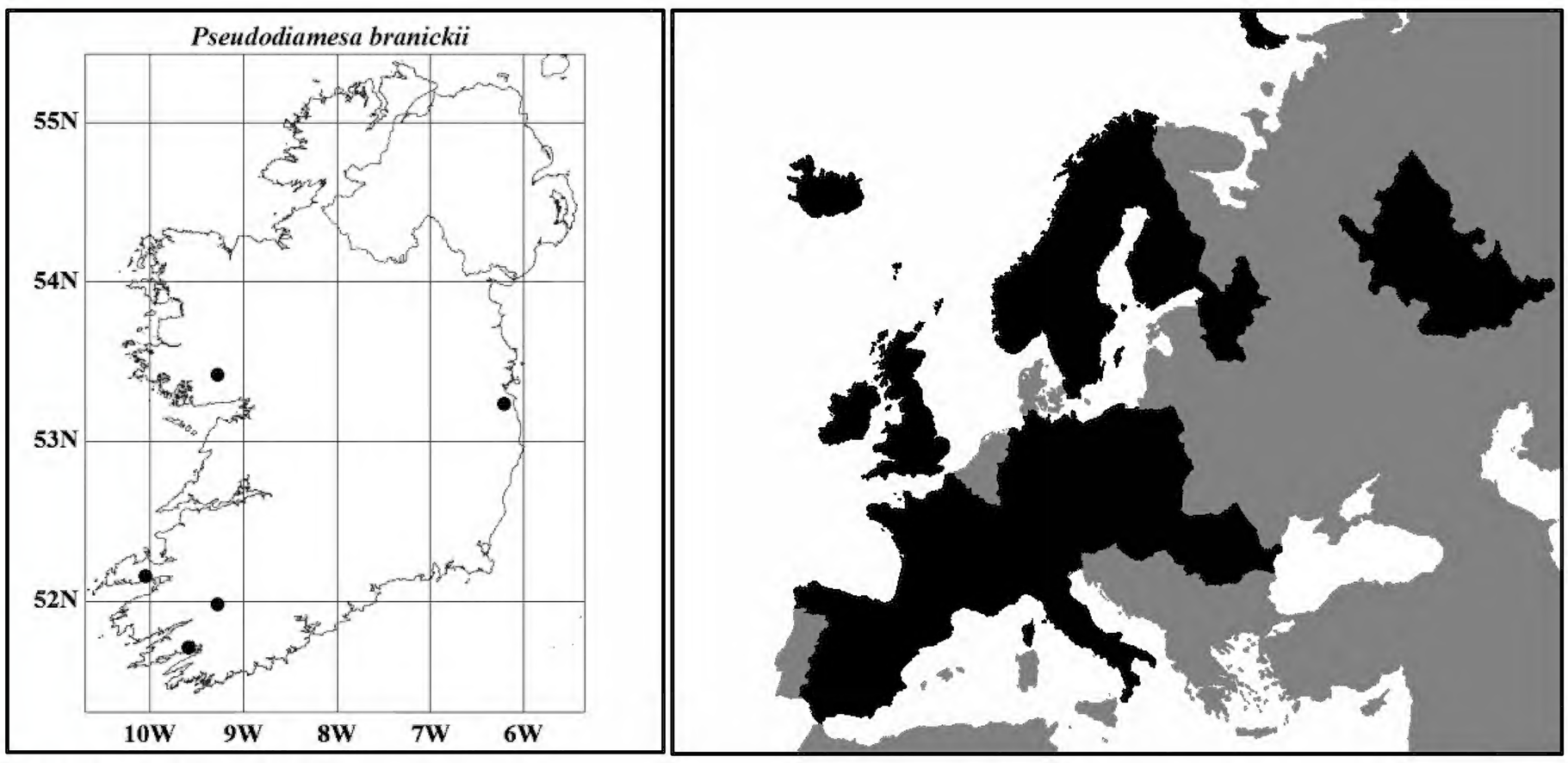
FIGURES 141-142. *Potthastia longimanus* Kieffer, 1922.



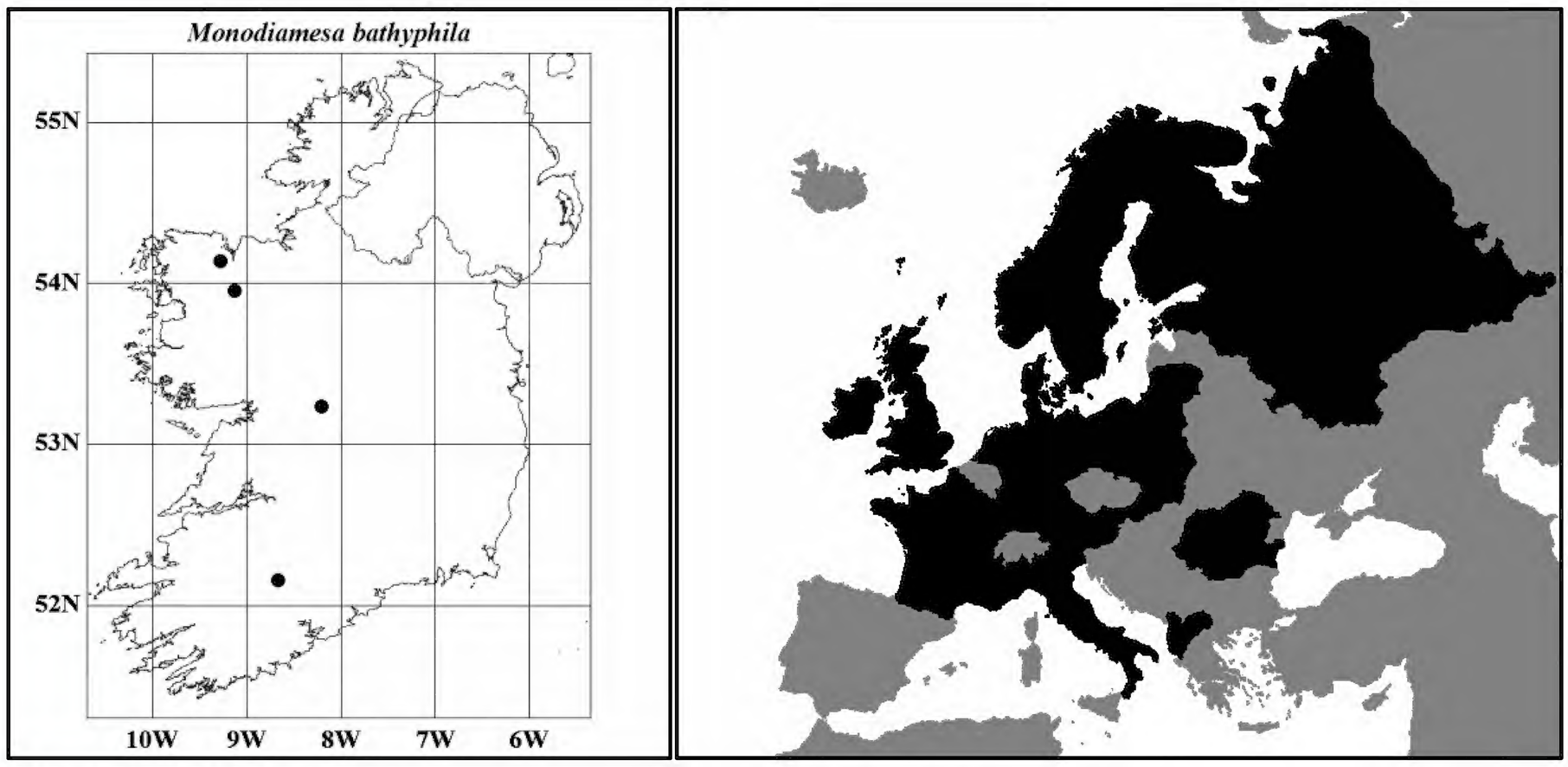
FIGURES 143-144. *Potthastia montium* (Edwards, 1929).



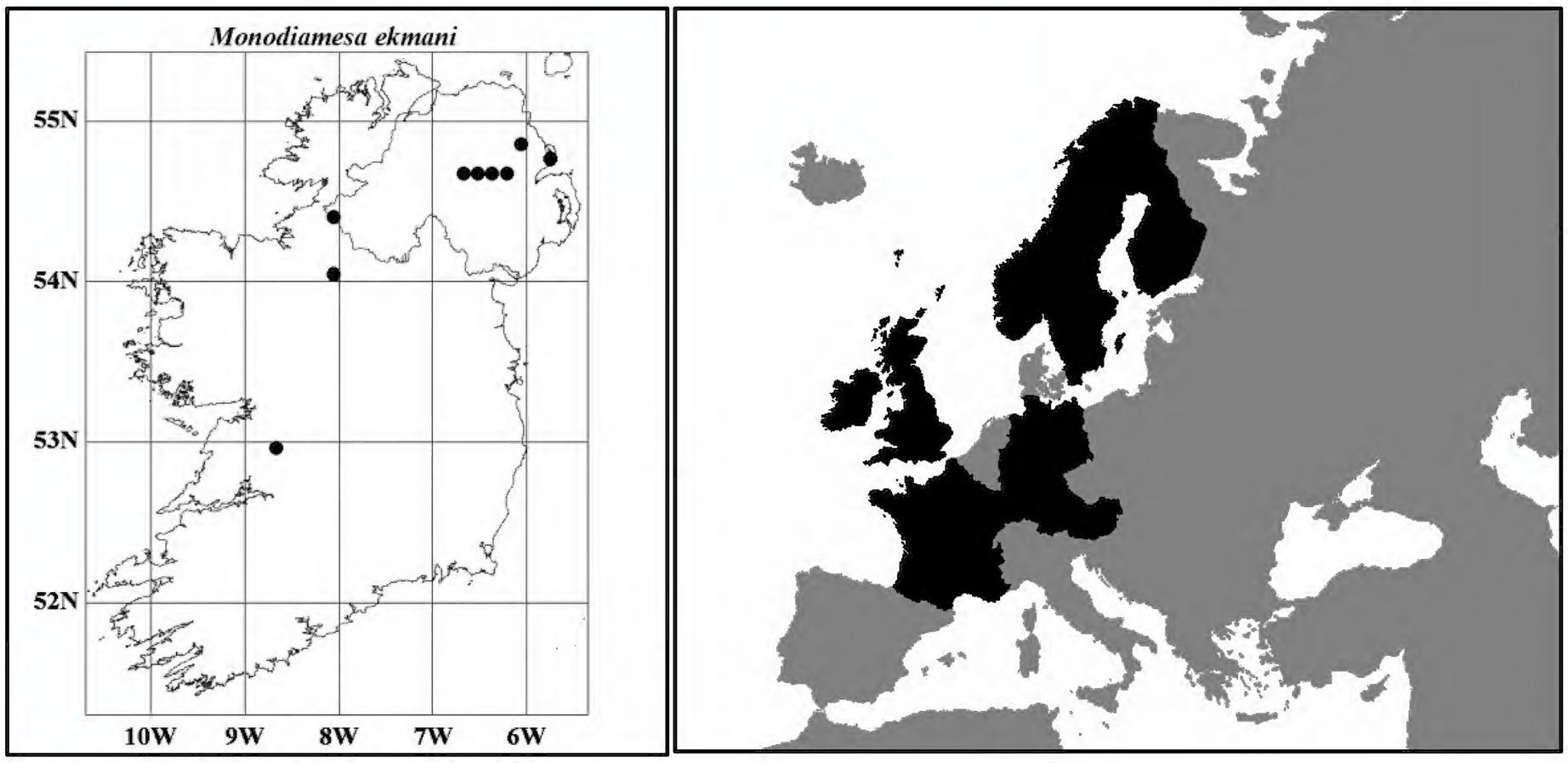
FIGURES 145-146. *Protanypus morio* (Zetterstedt, 1838).



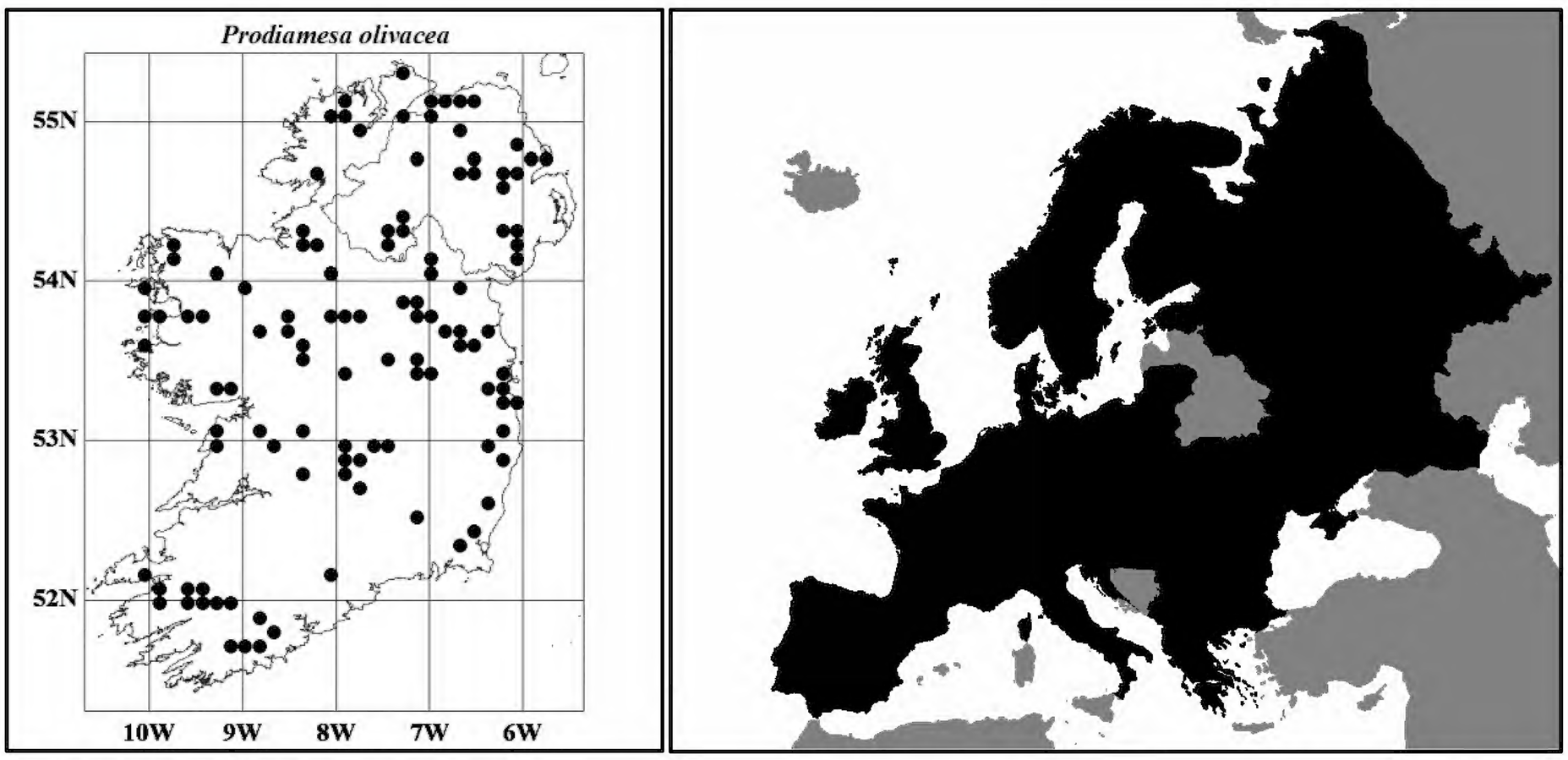
FIGURES 147-148. *Pseudodiamesa branickii* (Nowicki, 1873).



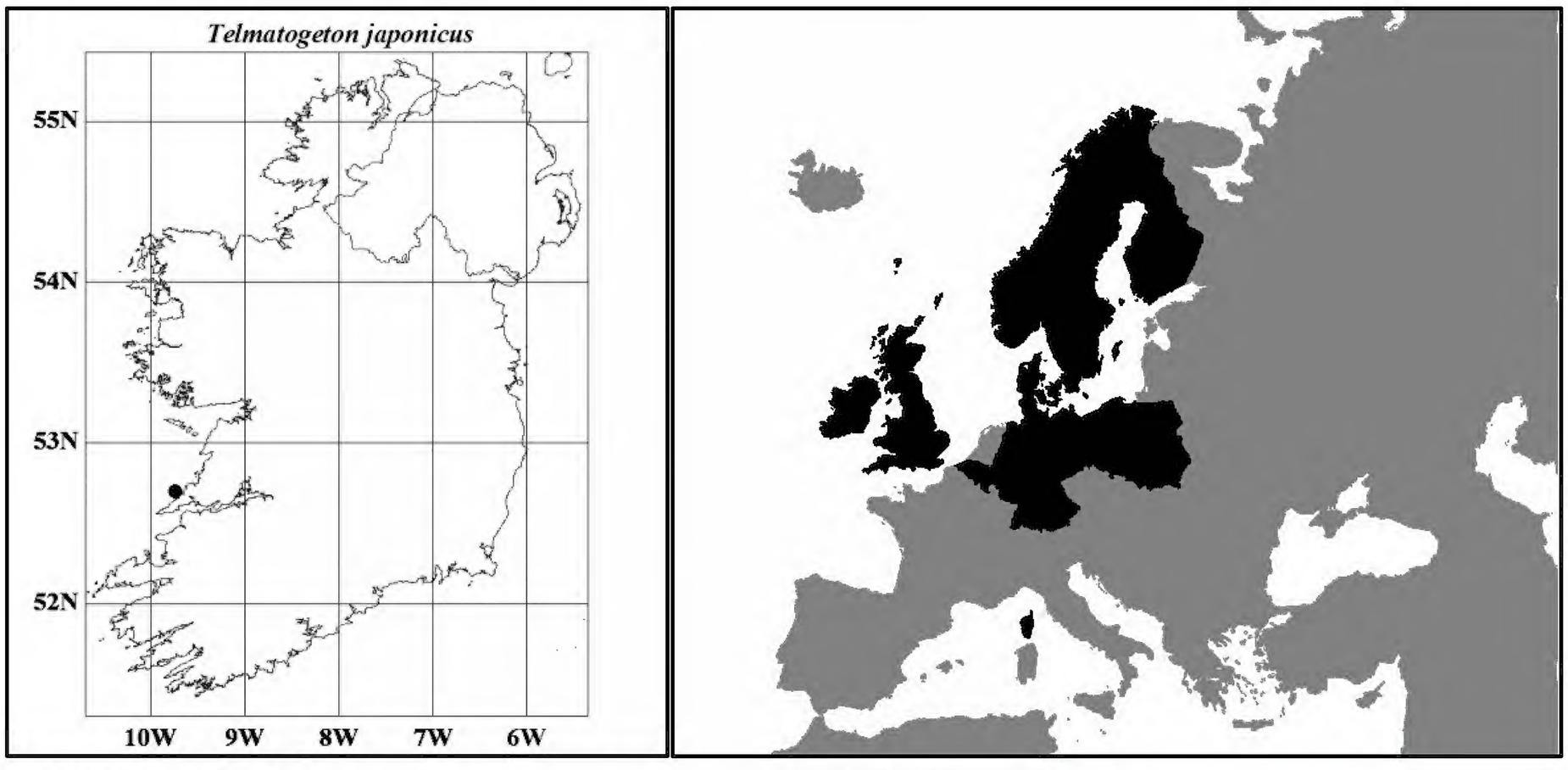
FIGURES 149-150. *Monodiamesa bathyphila* (Kieffer, 1918).



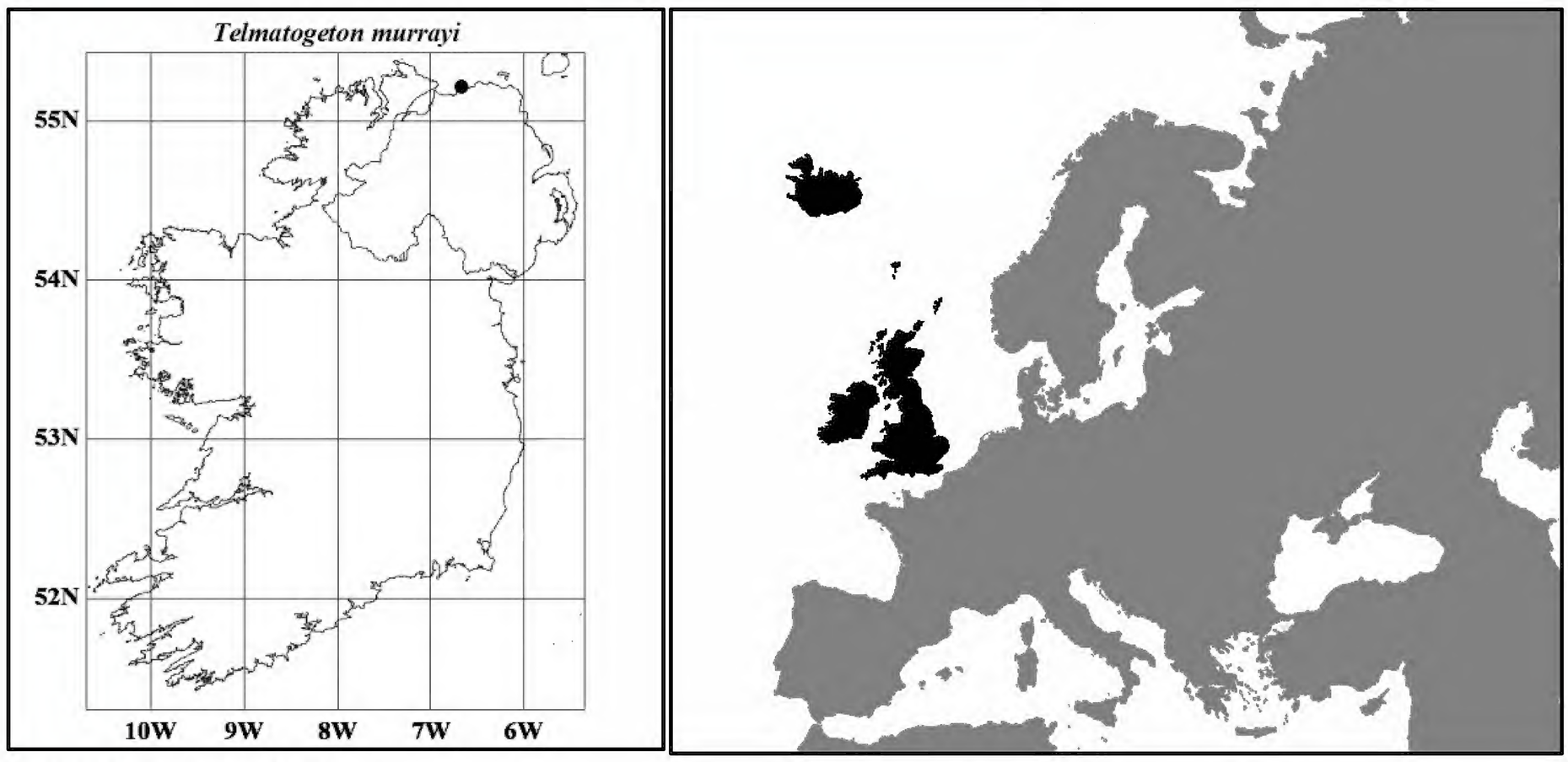
FIGURES 151-152. *Monodiamesa ekmani* (Brundin, 1949).



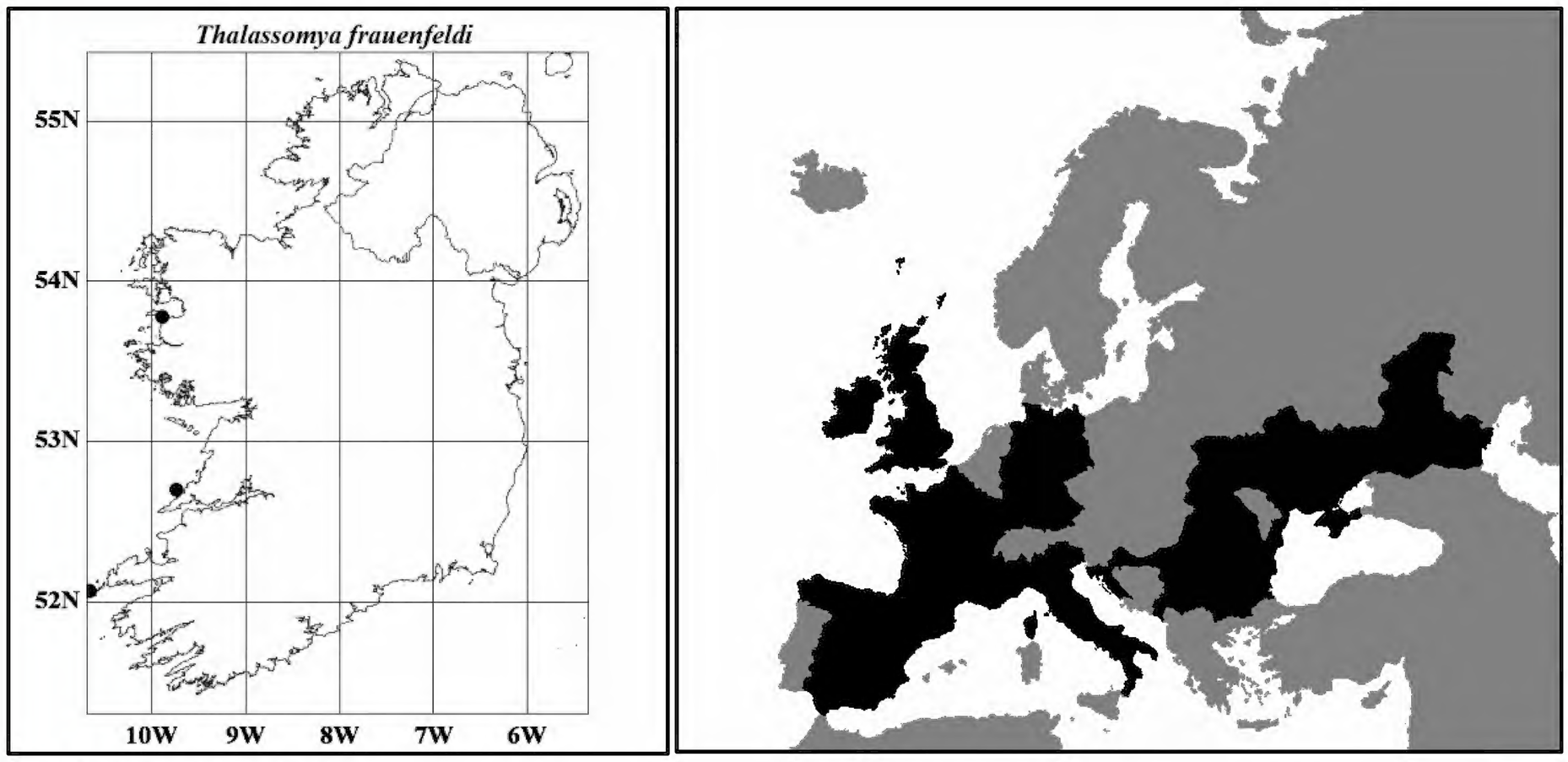
FIGURES 153-154. *Prodiamesa olivacea* (Meigen, 1818).



FIGURES 155-156. *Telmatogeton japonicus* Tokunaga, 1933.

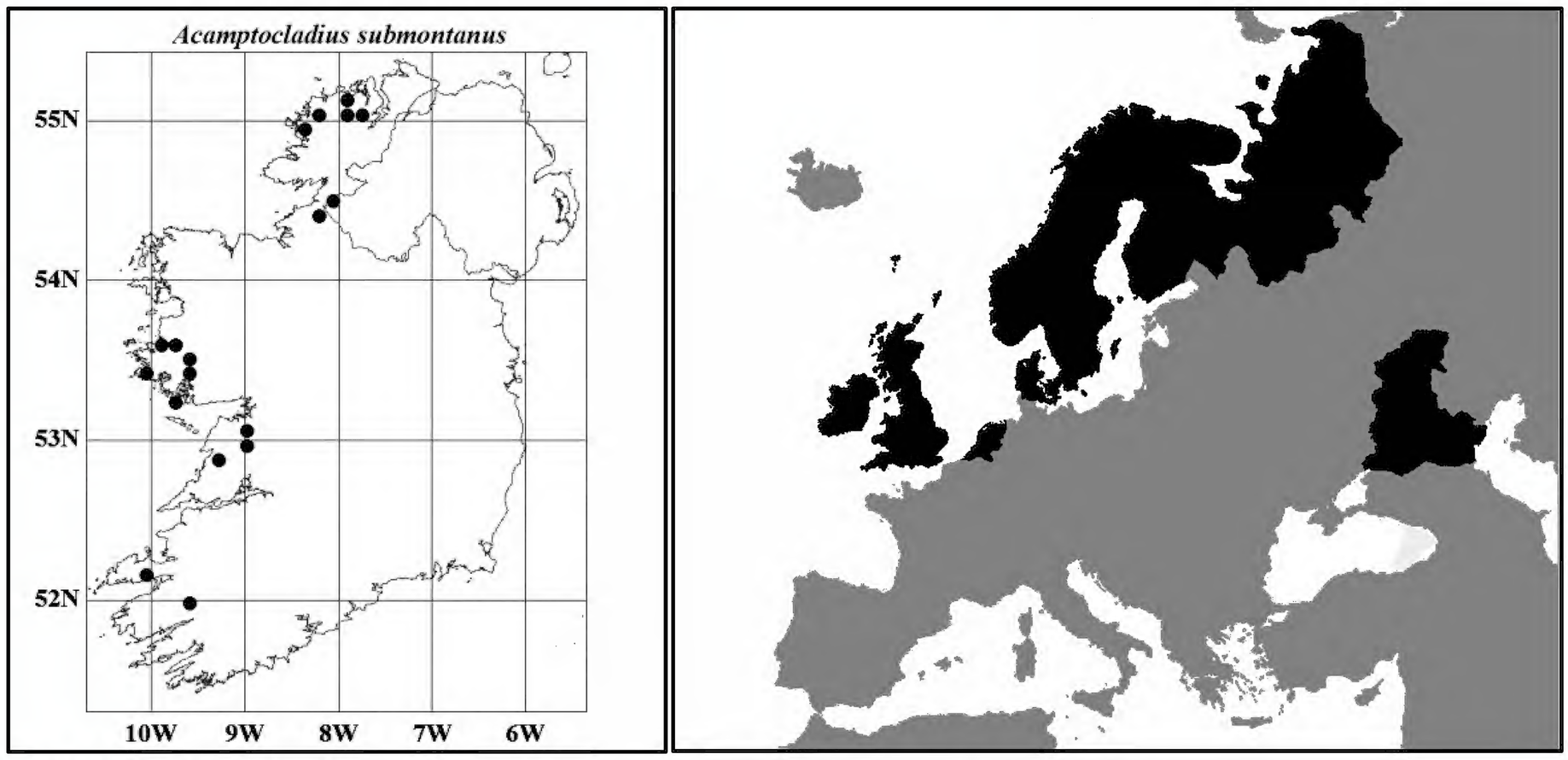


FIGURES 157-158. *Telmatogeton murrayi* Sæther, 2009.

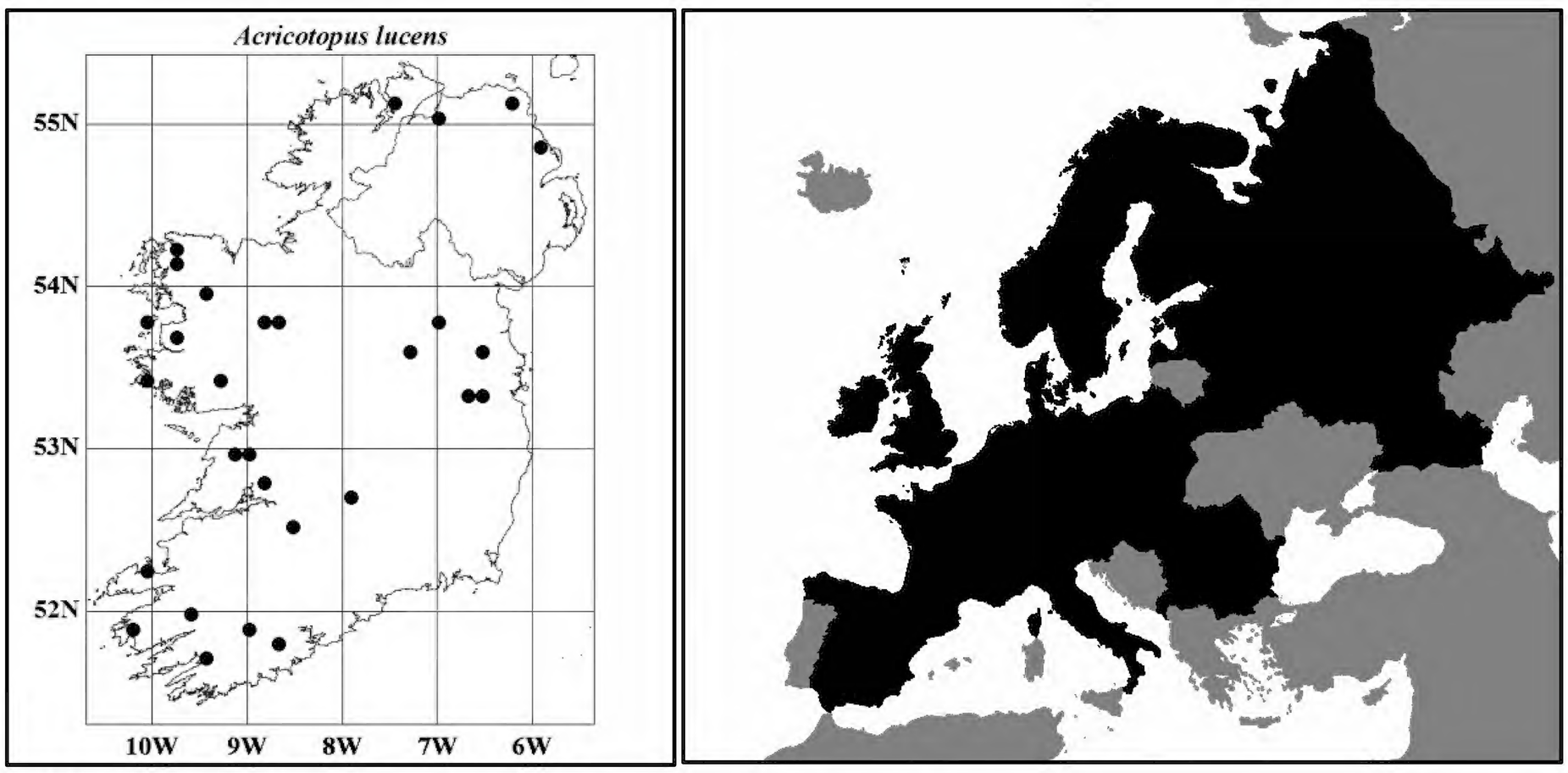


FIGURES 159-160. *Thalassomya frauenfeldi* Schiner, 1856.

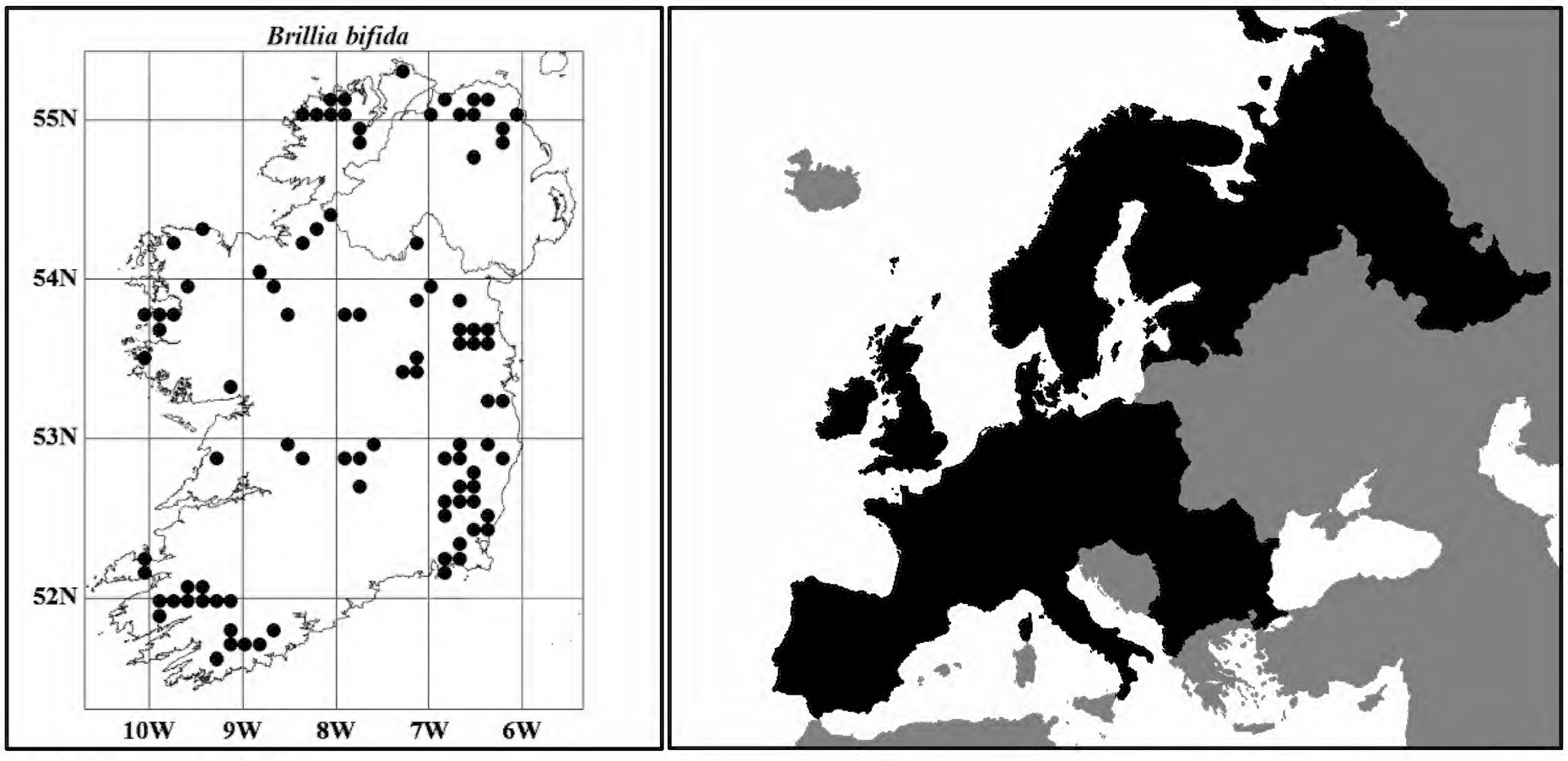
FIGURES 161-162. *Acamptocladius reissi* Cranston & Sæther, 1982.



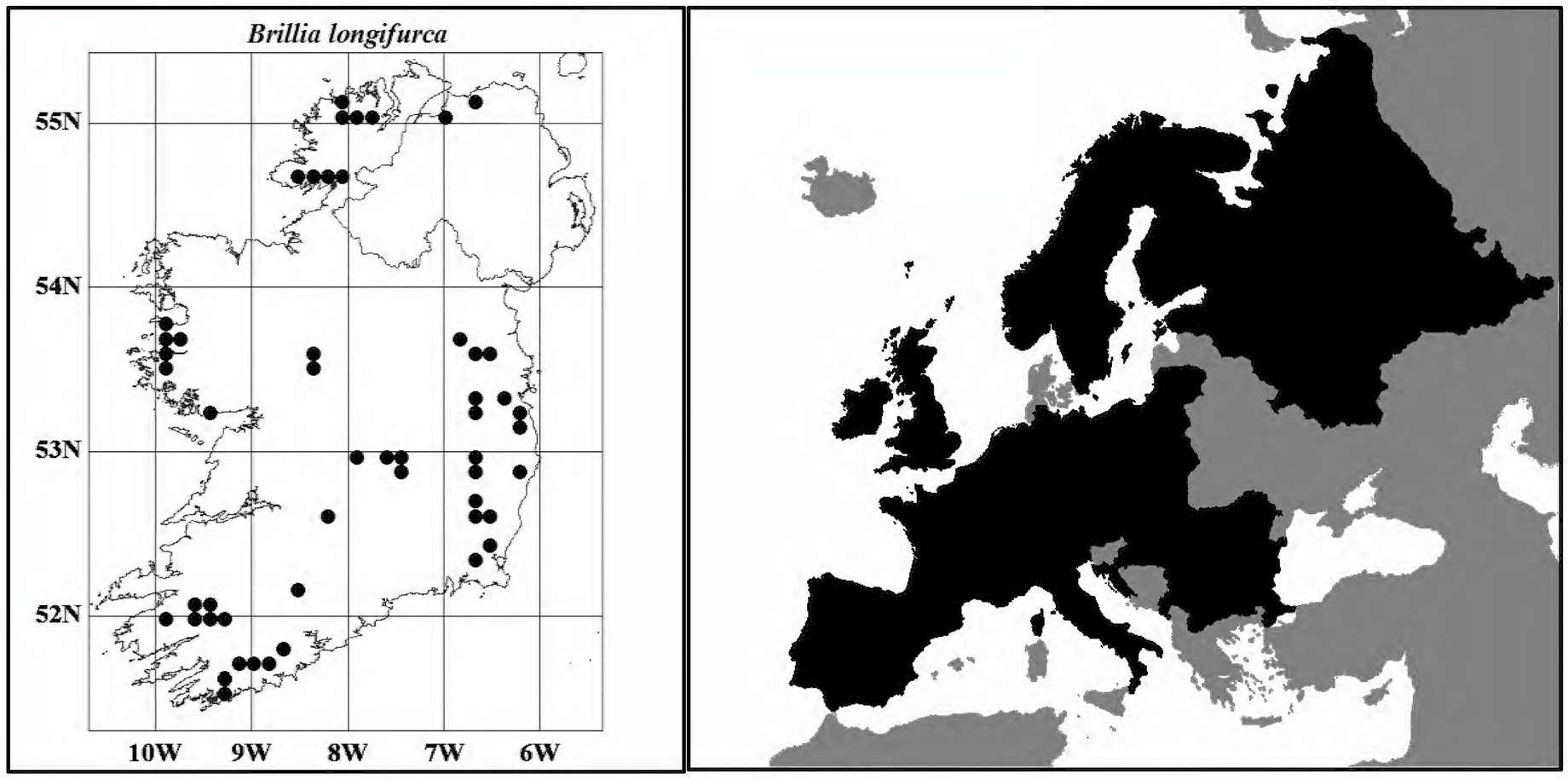
FIGURES 163-164. *Acamptocladius submontanus* (Edwards, 1932).



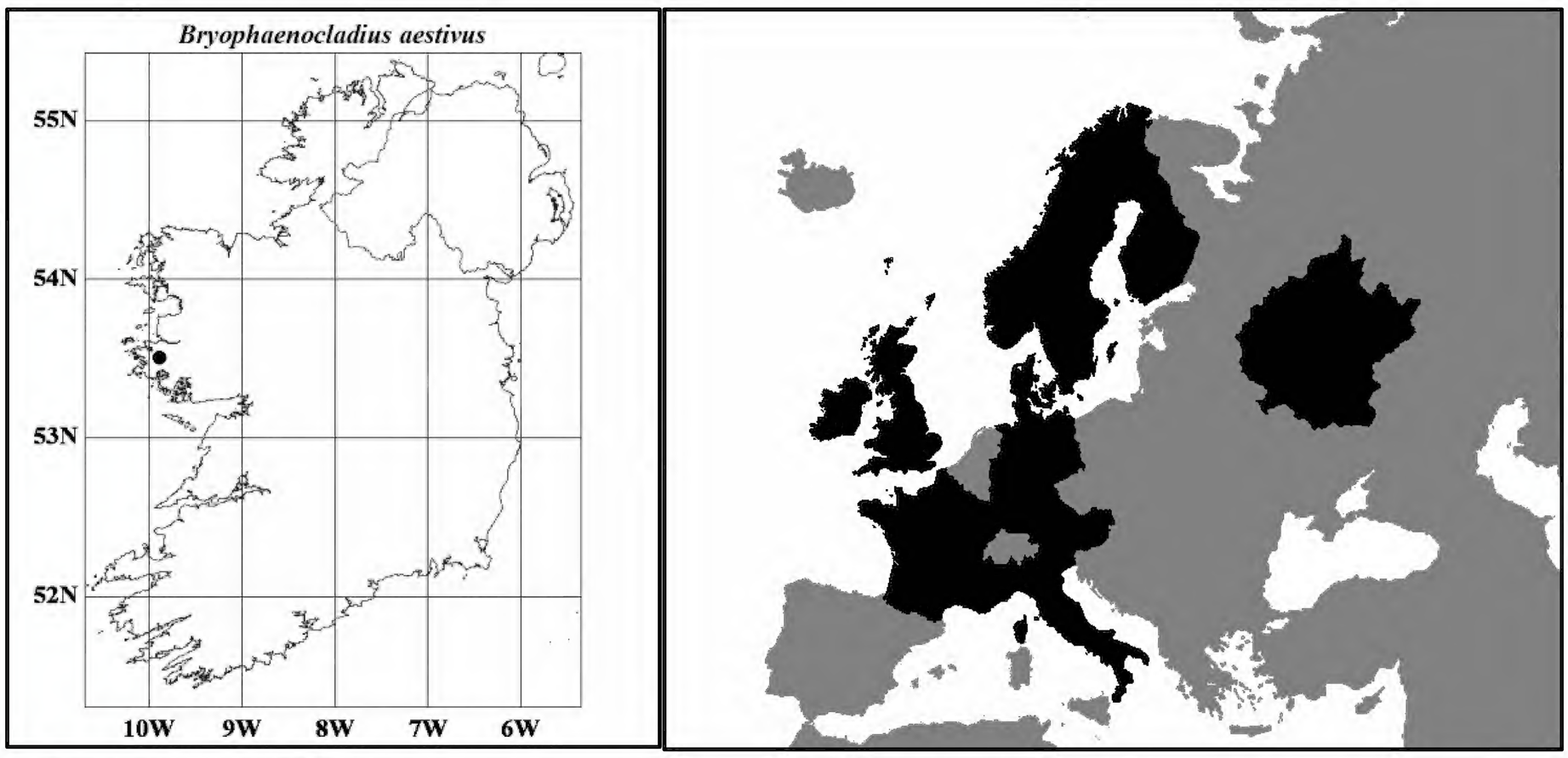
FIGURES 165-166. *Acricotopus lucens* (Zetterstedt, 1850).



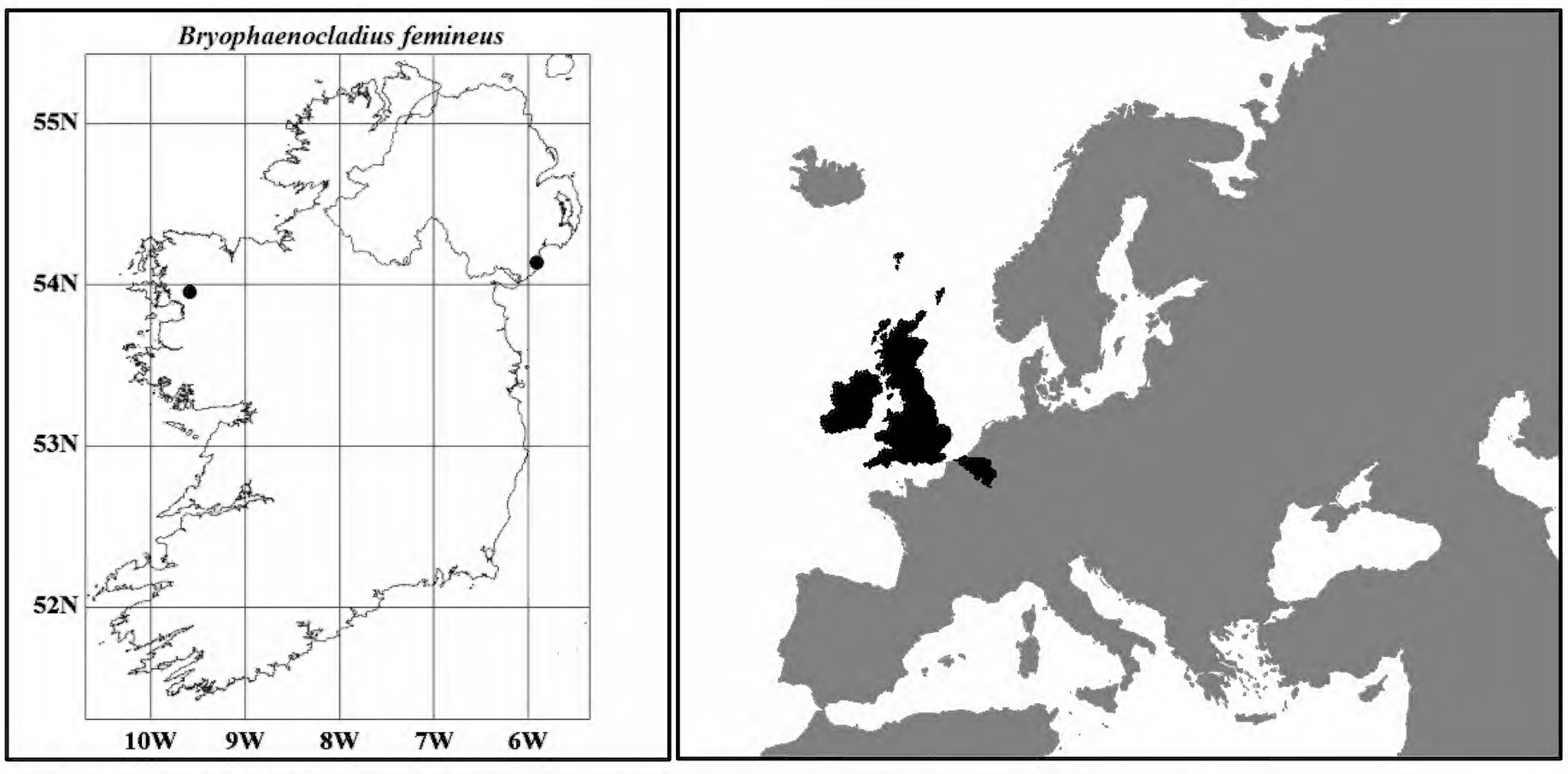
FIGURES 167-168. *Brillia bifida* (Kieffer, 1909).



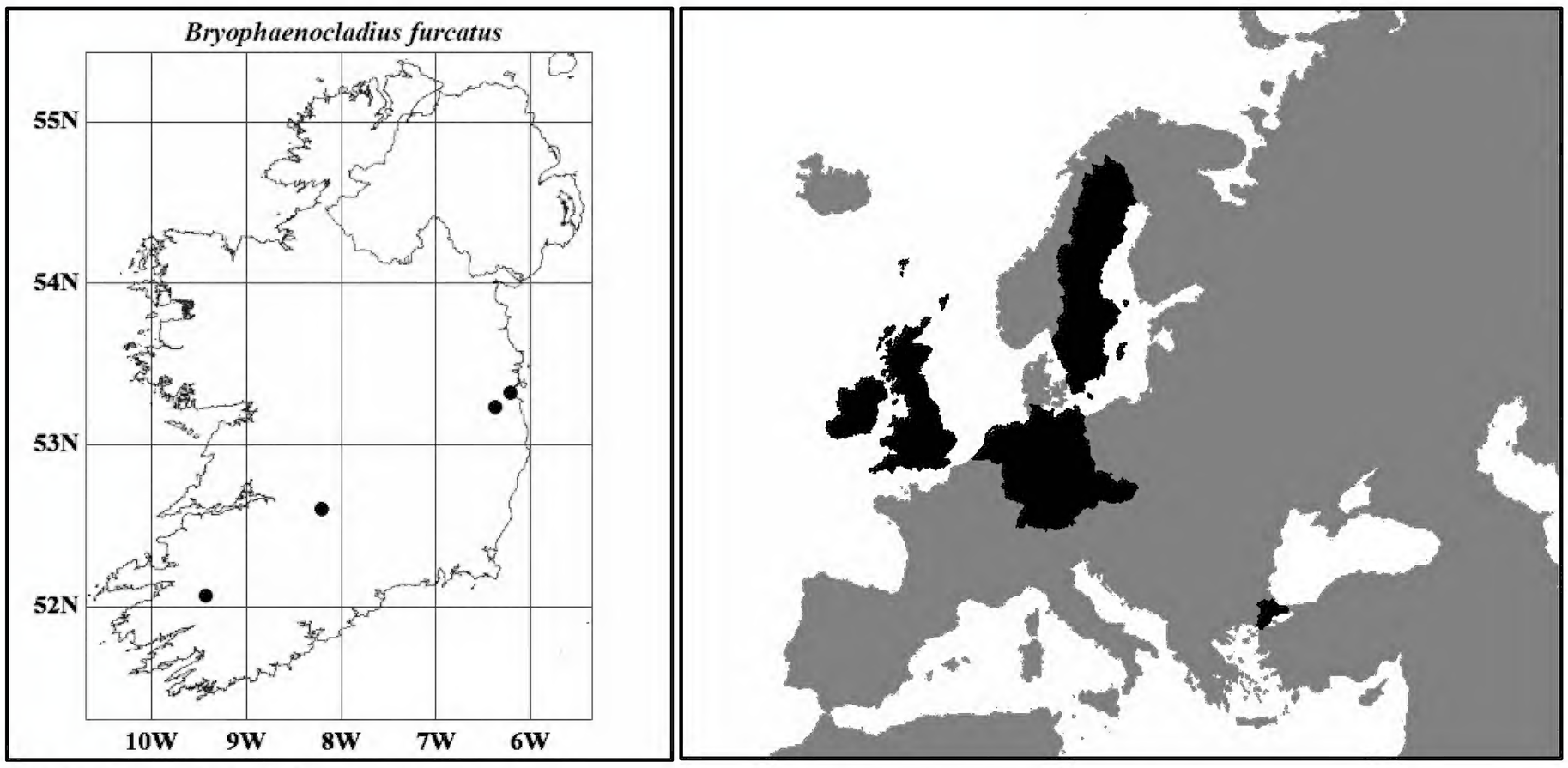
FIGURES 169-170. *Brillia longifurca* Kieffer, 1921.



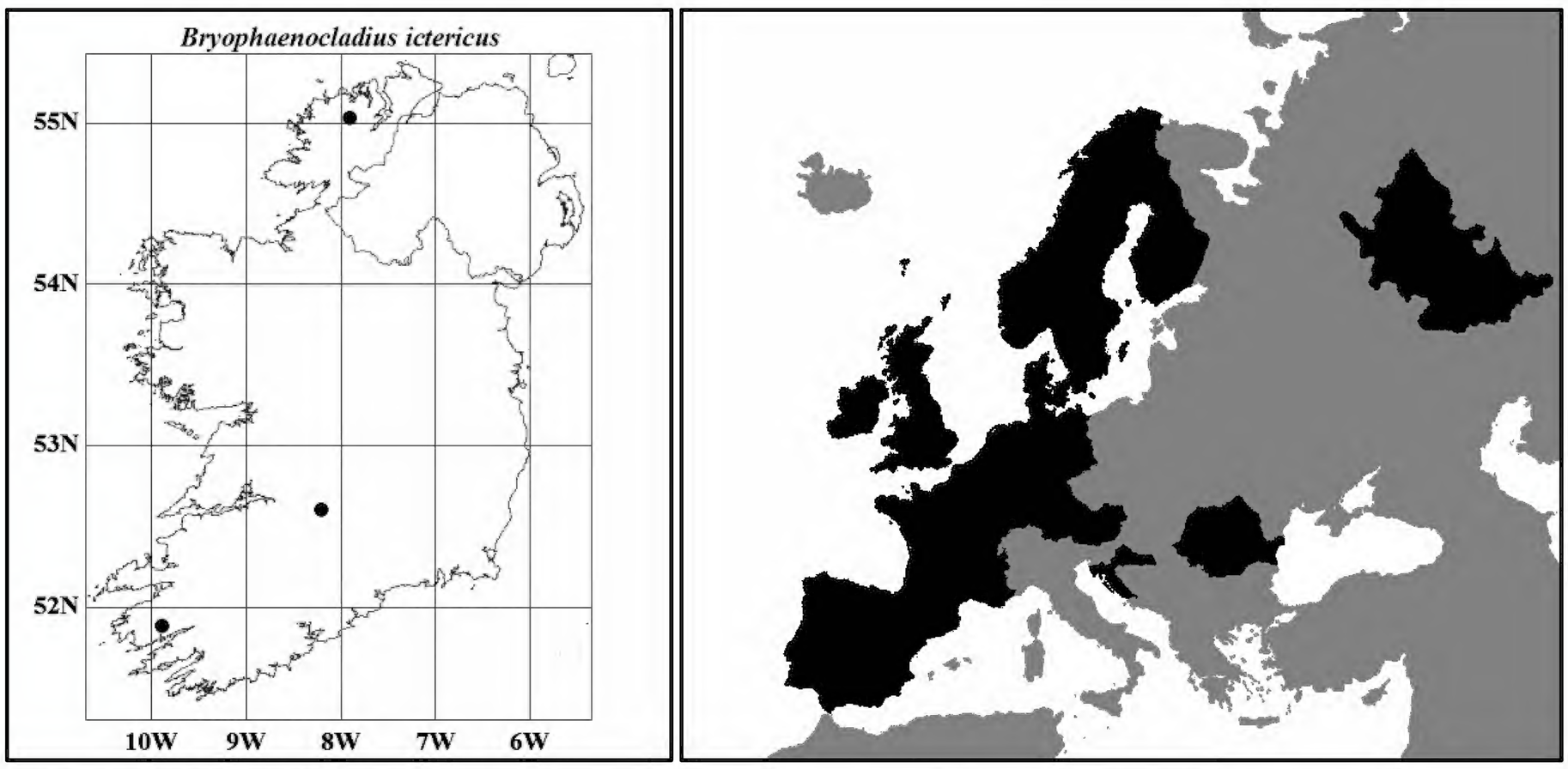
FIGURES 171-172. *Bryophaenocladius aestivus* (Brundin, 1947).



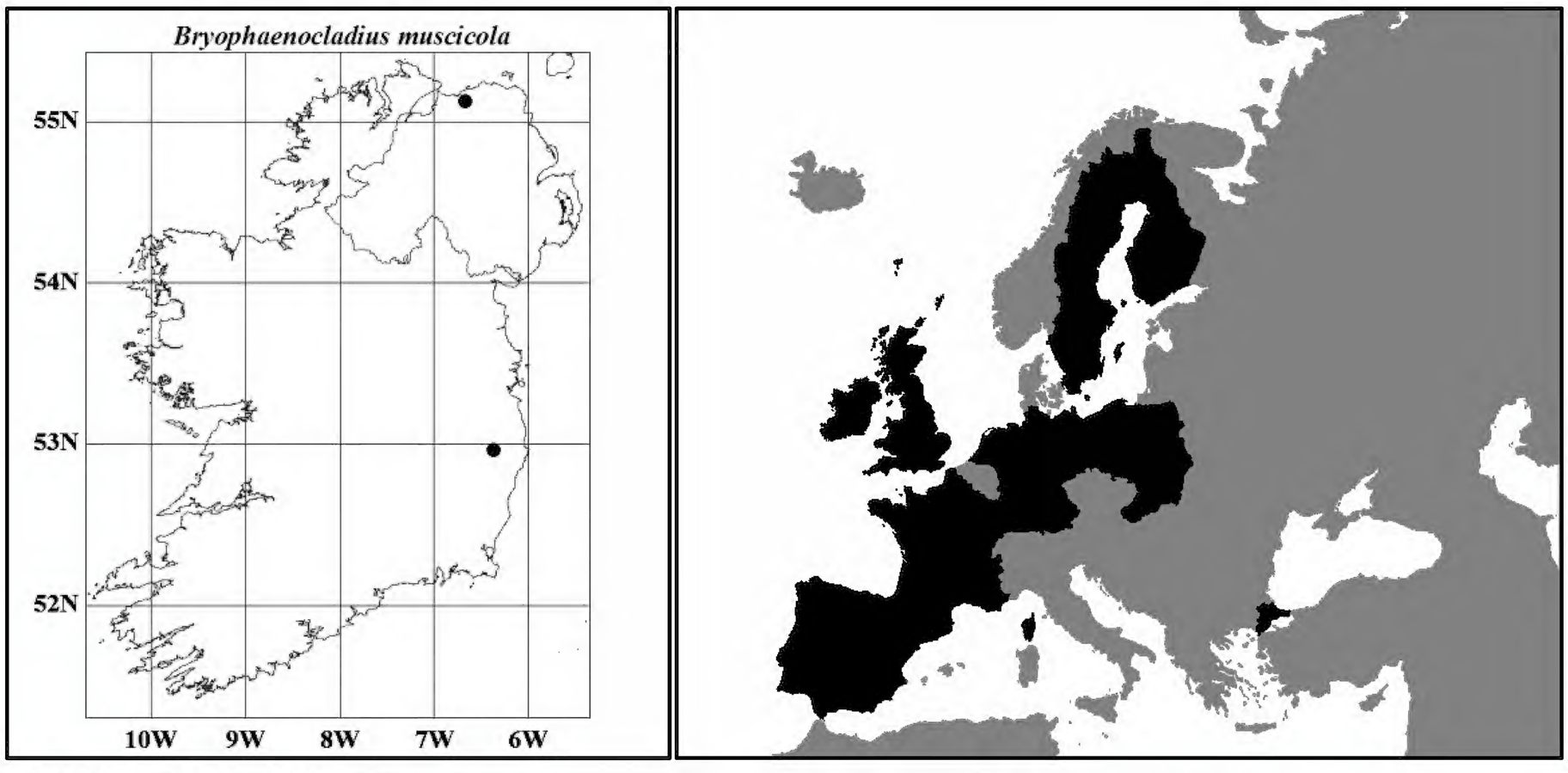
FIGURES 173-174. *Bryophaenocladius femineus* (Edwards, 1929).



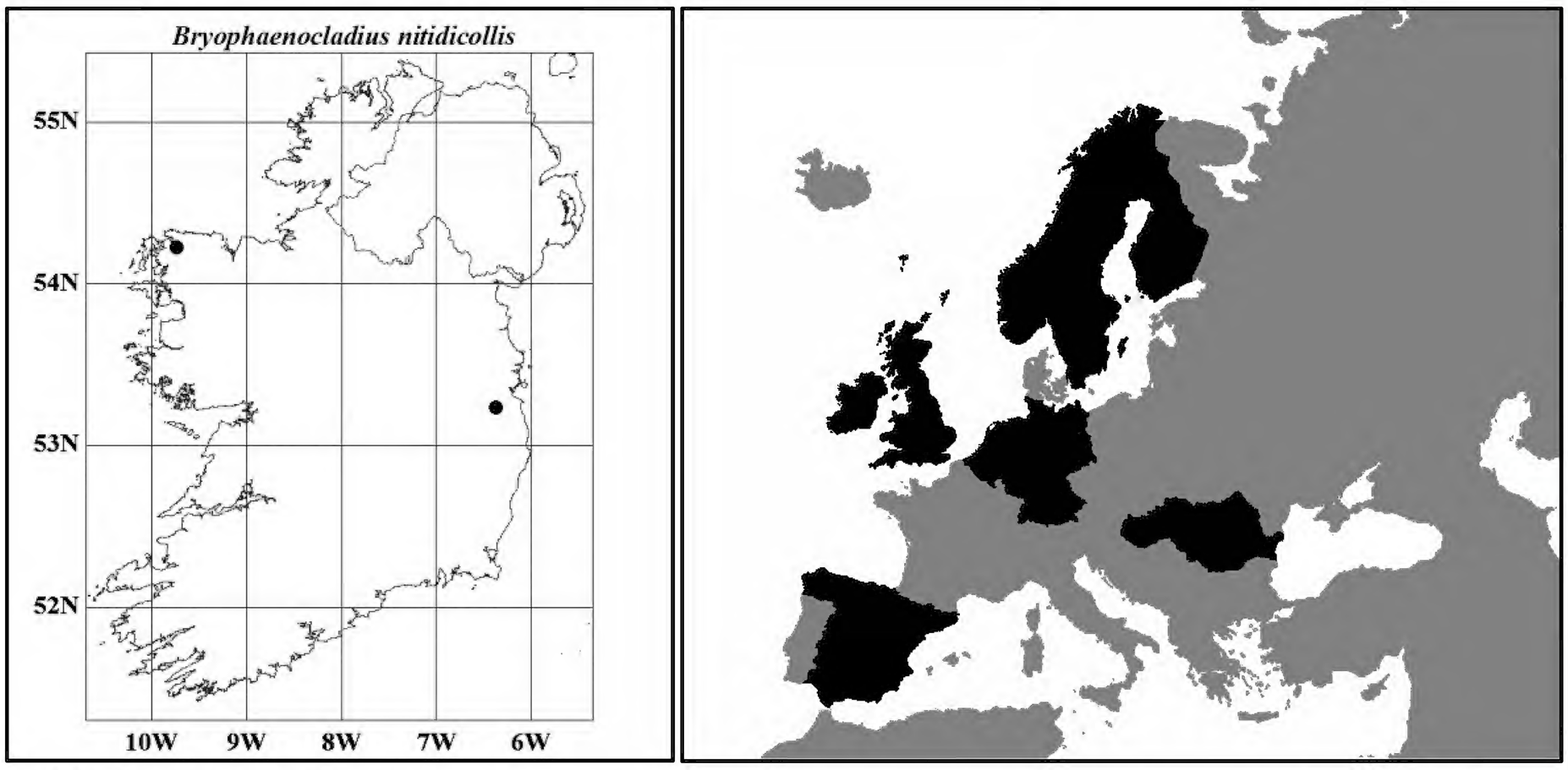
FIGURES 175-176. *Bryophaenocladius furcatus* (Kieffer, 1916).



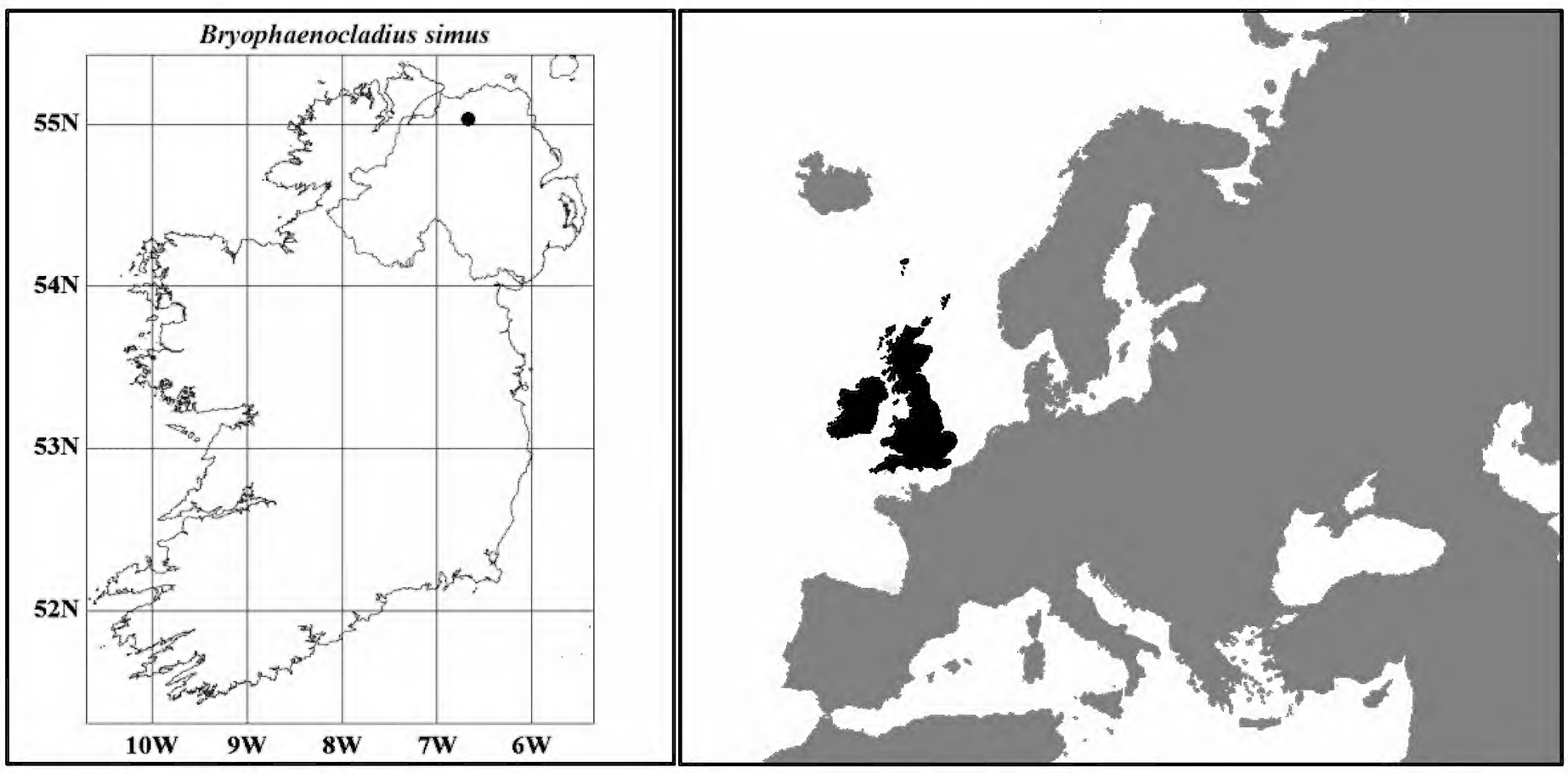
FIGURES 177-178. *Bryophaenocladius ictericus* (Meigen, 1830).



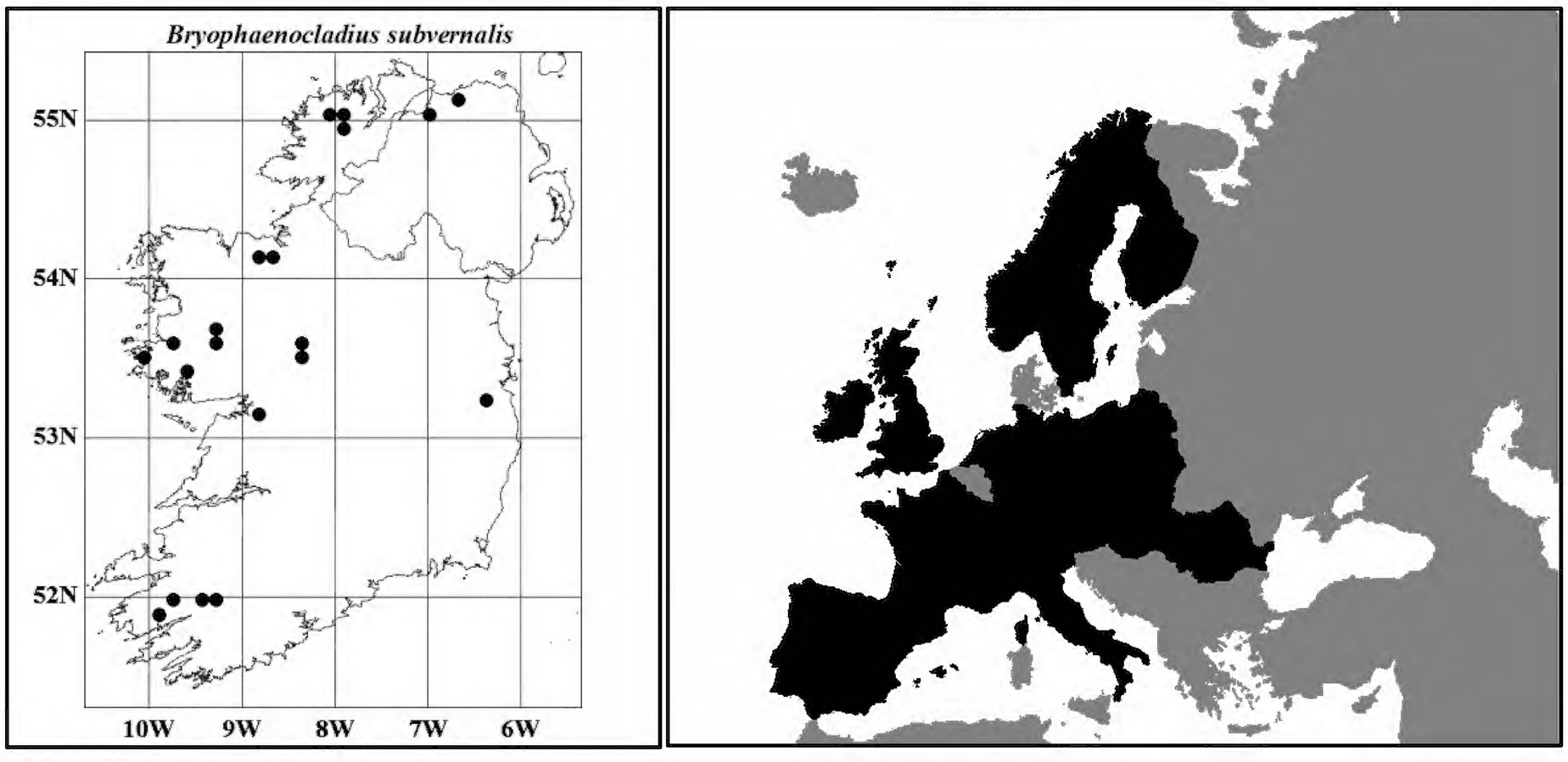
FIGURES 179-180. *Bryophaenocladius muscicola* (Kieffer, 1906).



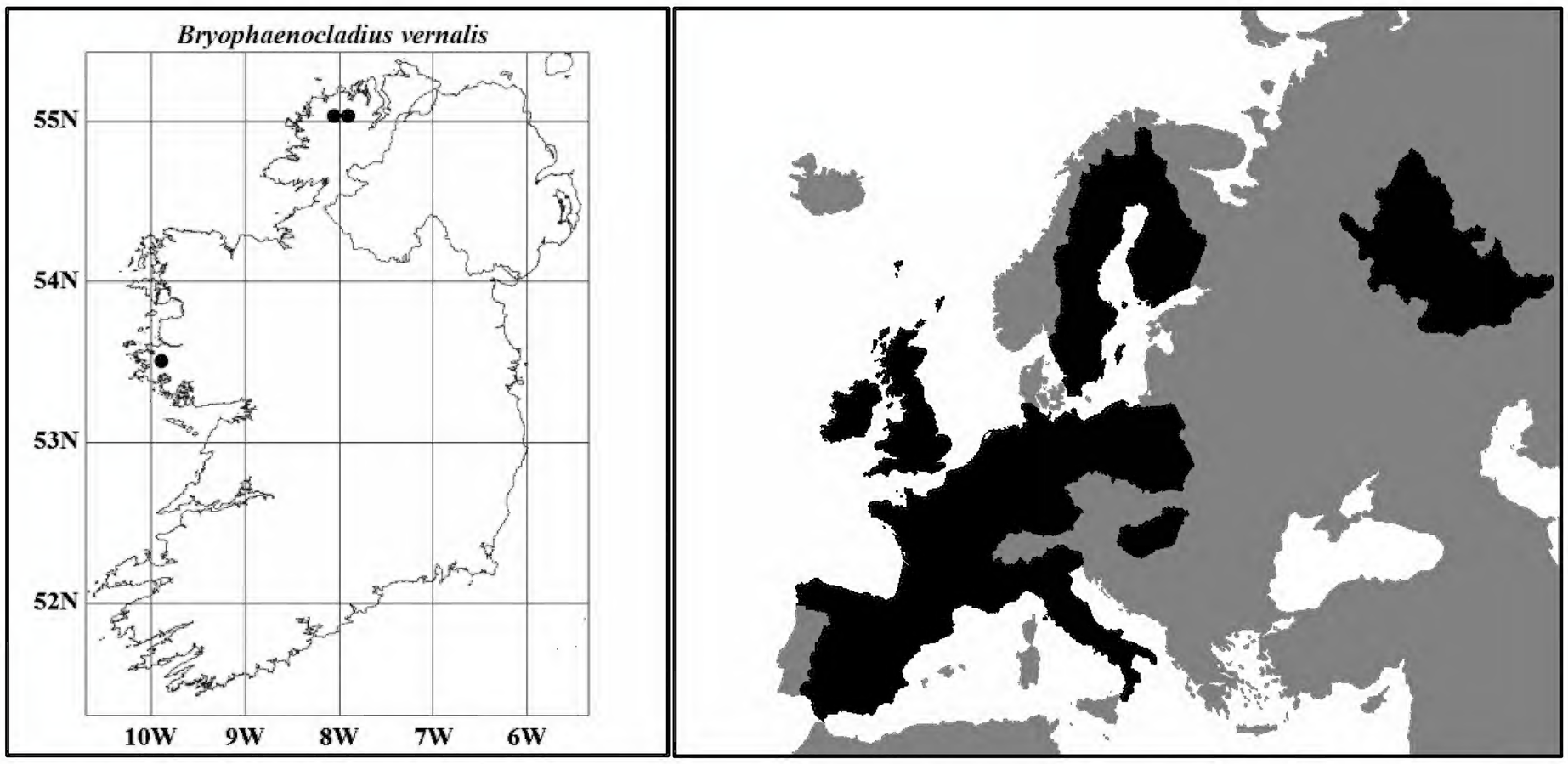
FIGURES 181-182. *Bryophaenocladius nitidicollis* (Goetghebuer, 1913).



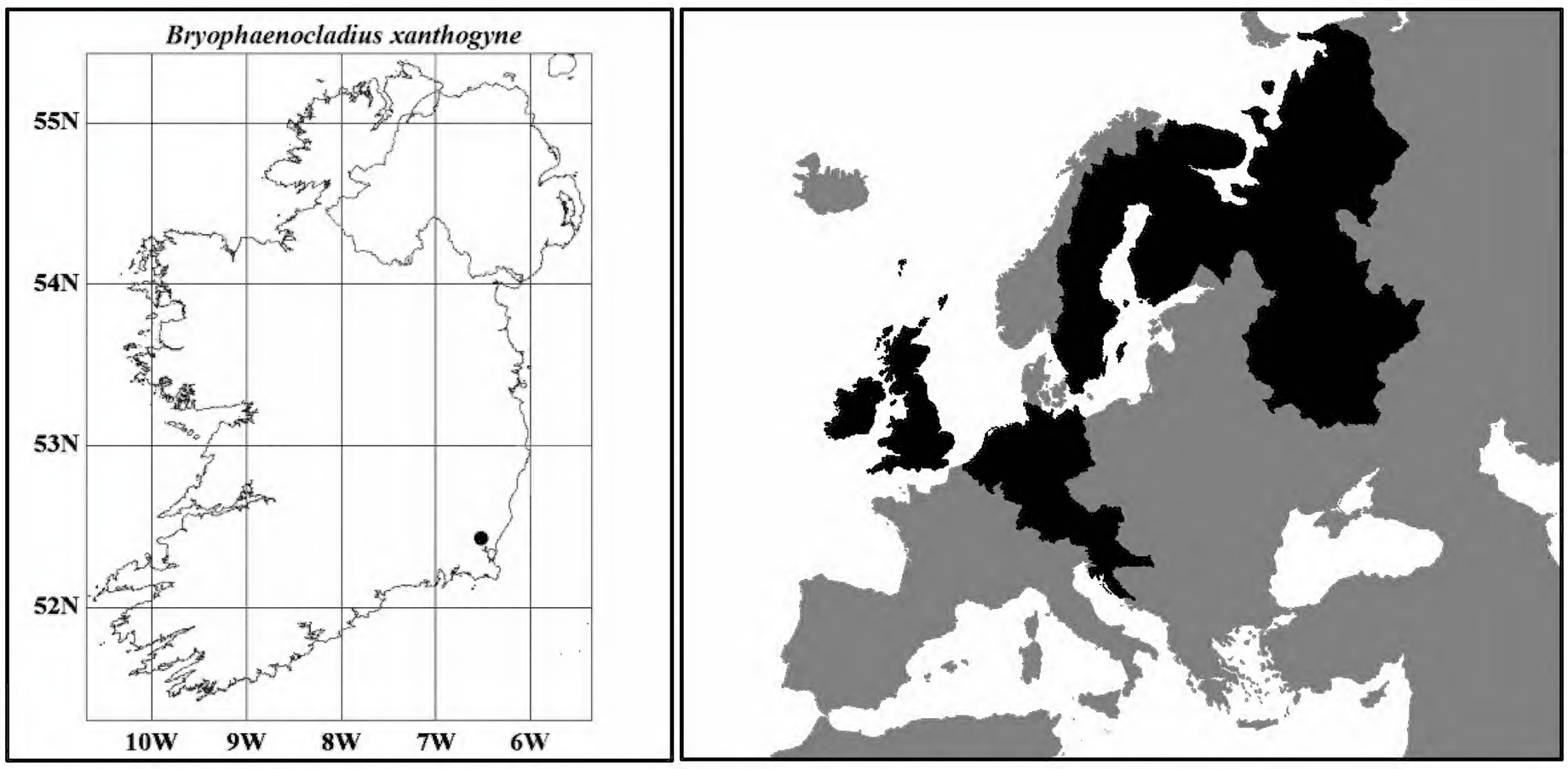
FIGURES 183-184. *Bryophaenocladius simus* (Edwards, 1929).



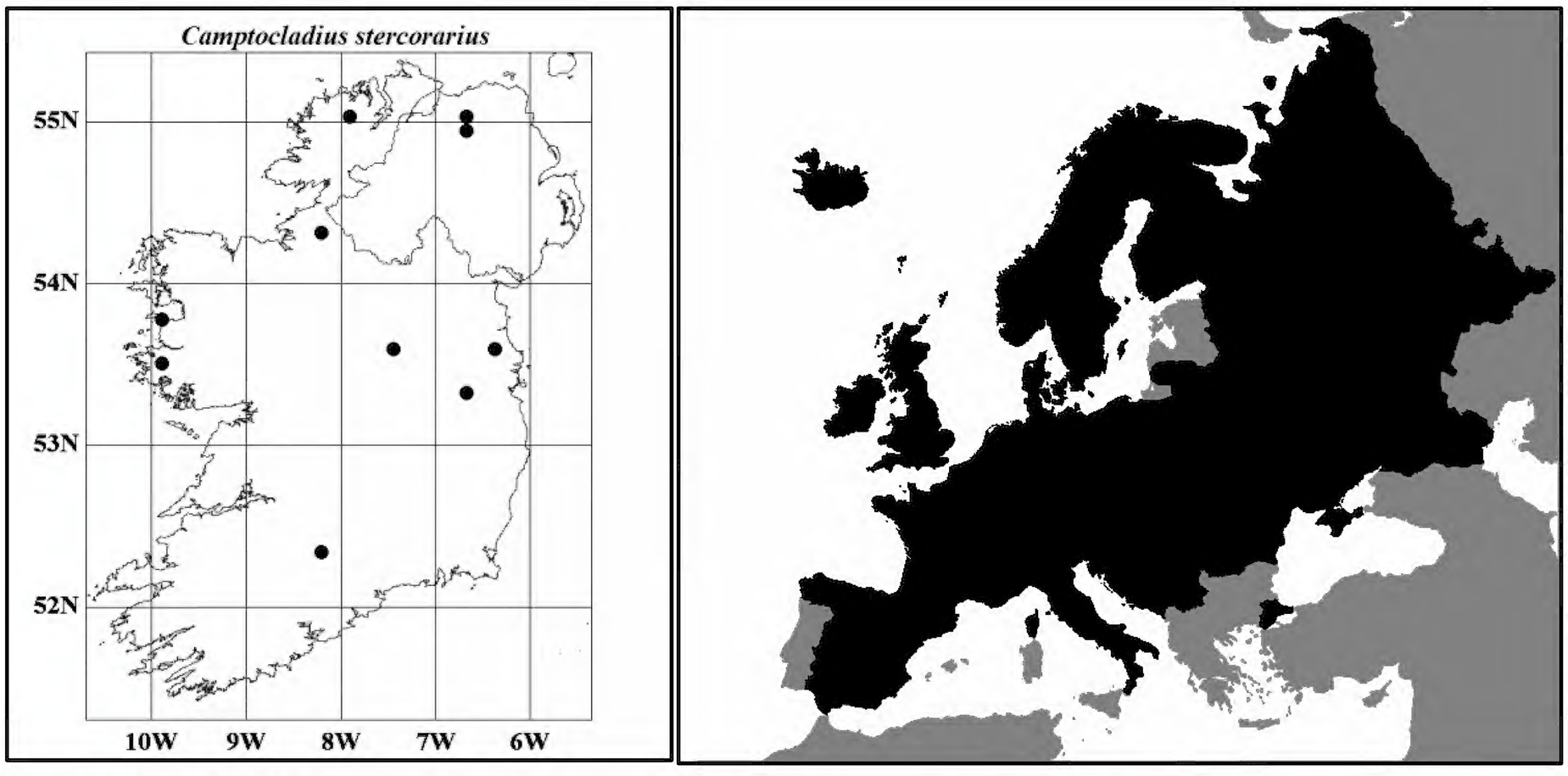
FIGURES 185-186. *Bryophaenocladius subvernalis* (Edwards, 1929).



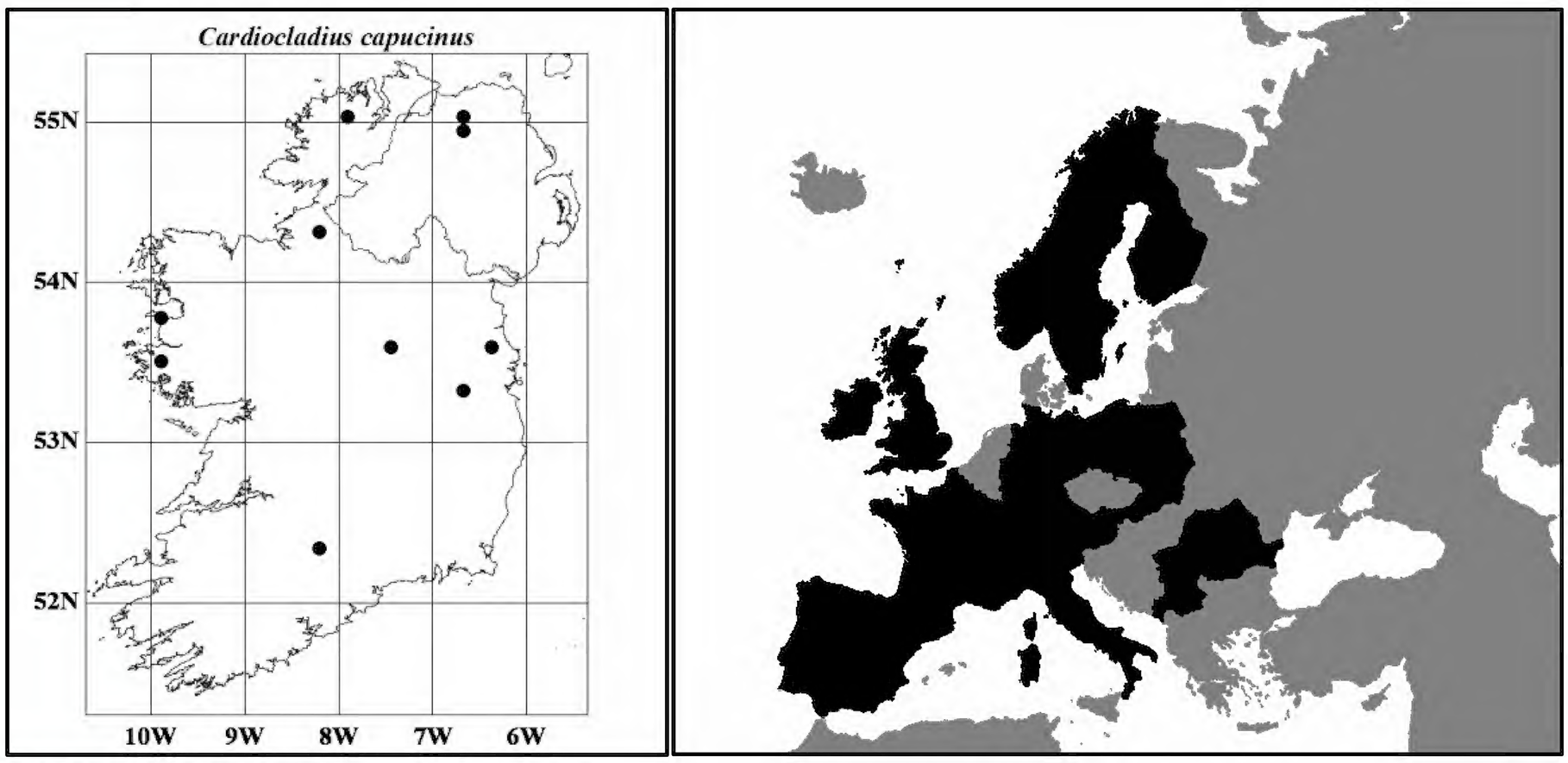
FIGURES 187-188. *Bryophaenocladius vernalis* (Goetghebuer, 1921).



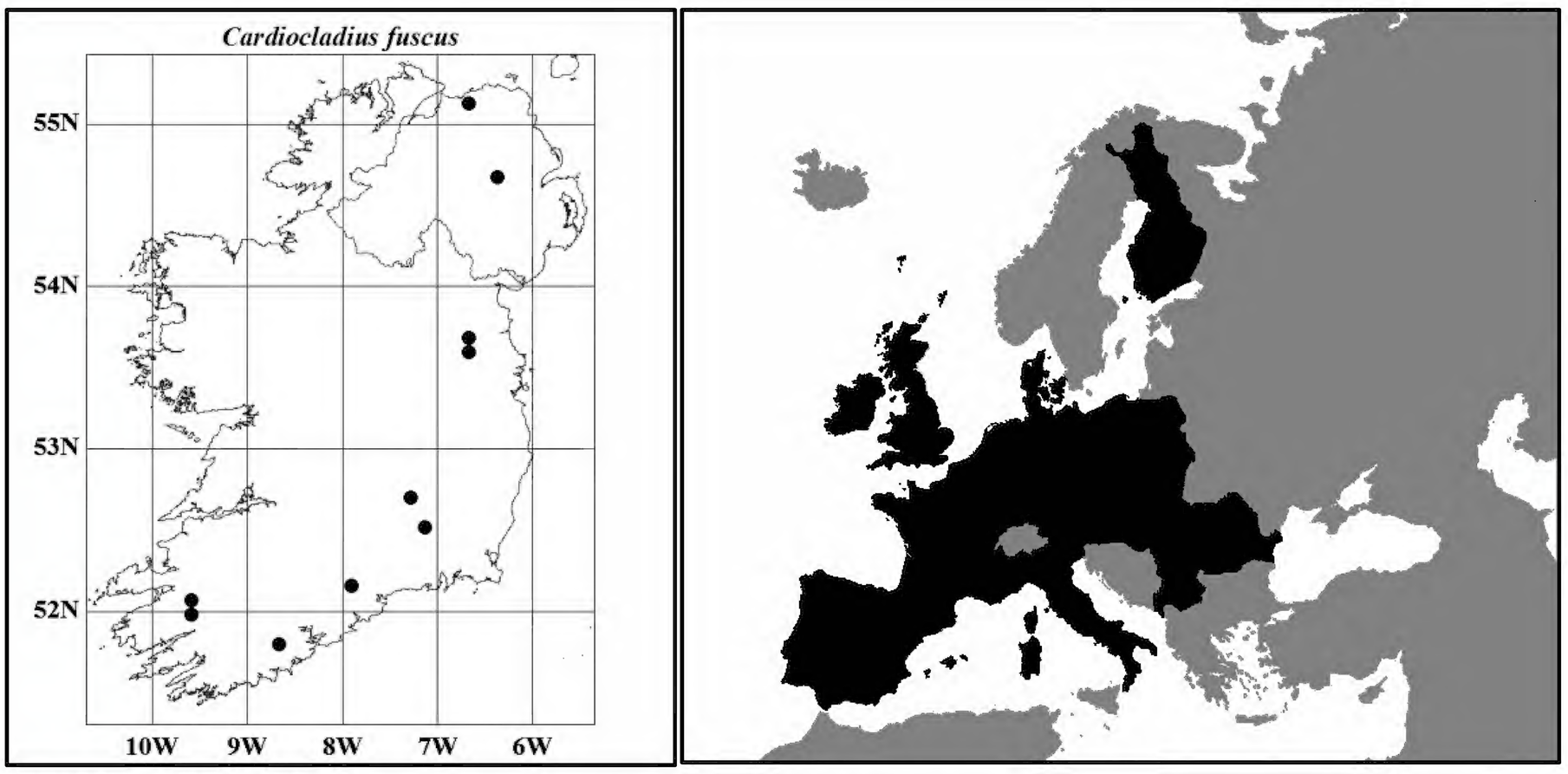
FIGURES 189-190. *Bryophaenocladius xanthogyne* (Edwards, 1929).



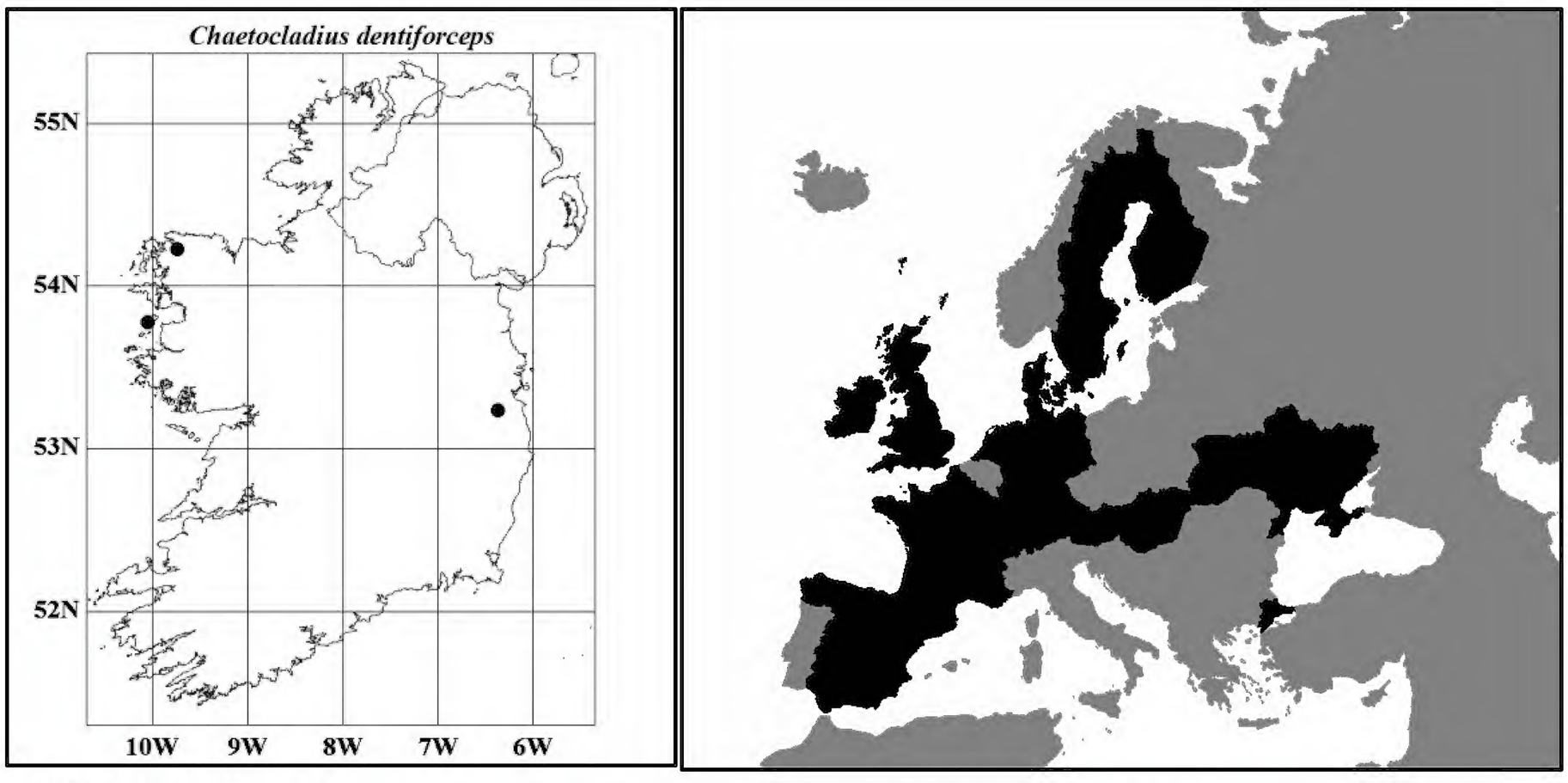
FIGURES 191-192. *Camptocladius stercorarius* (De Geer, 1776).



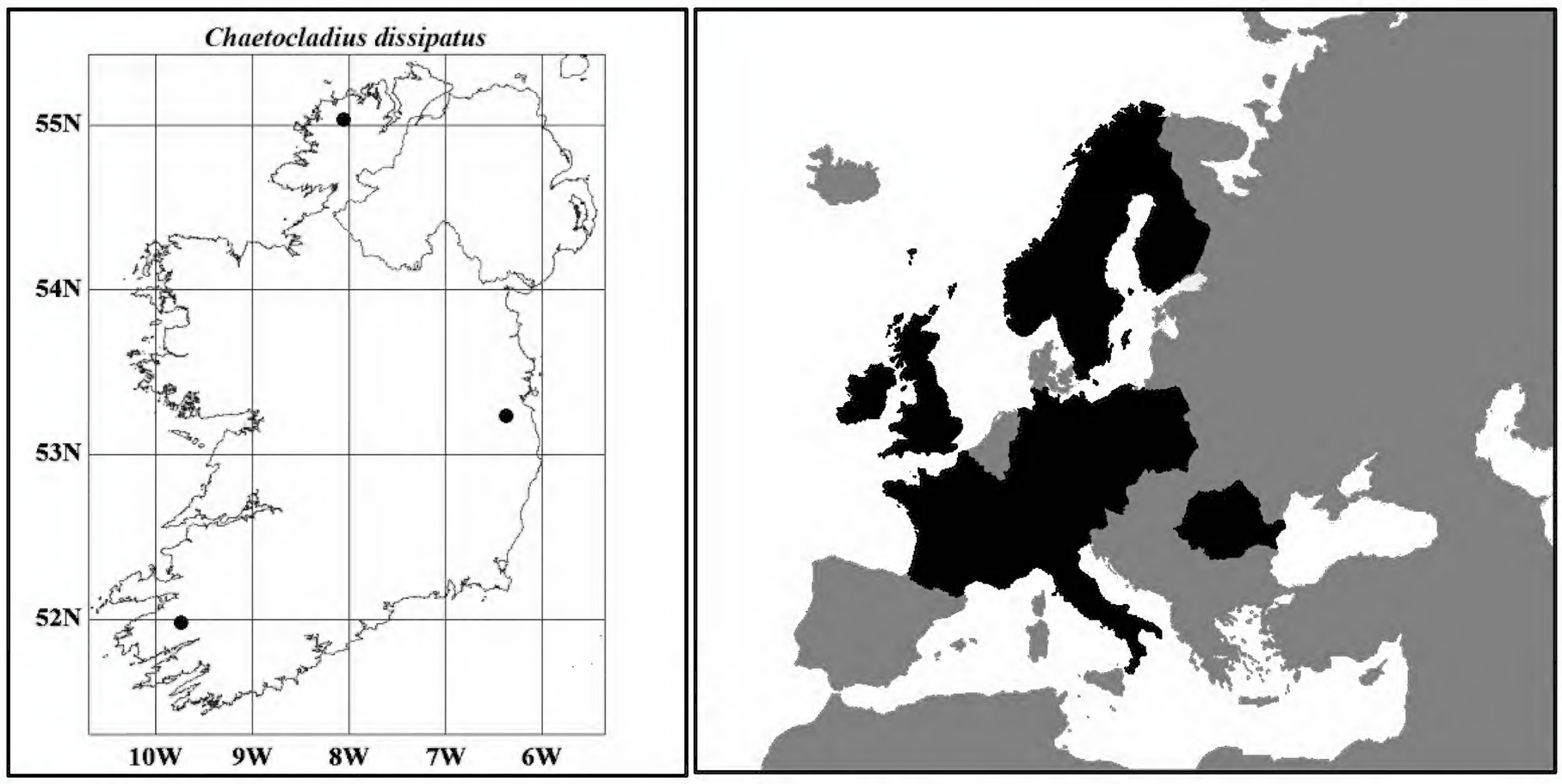
FIGURES 193-194. *Cardiocladius capucinus* (Zetterstedt, 1850).



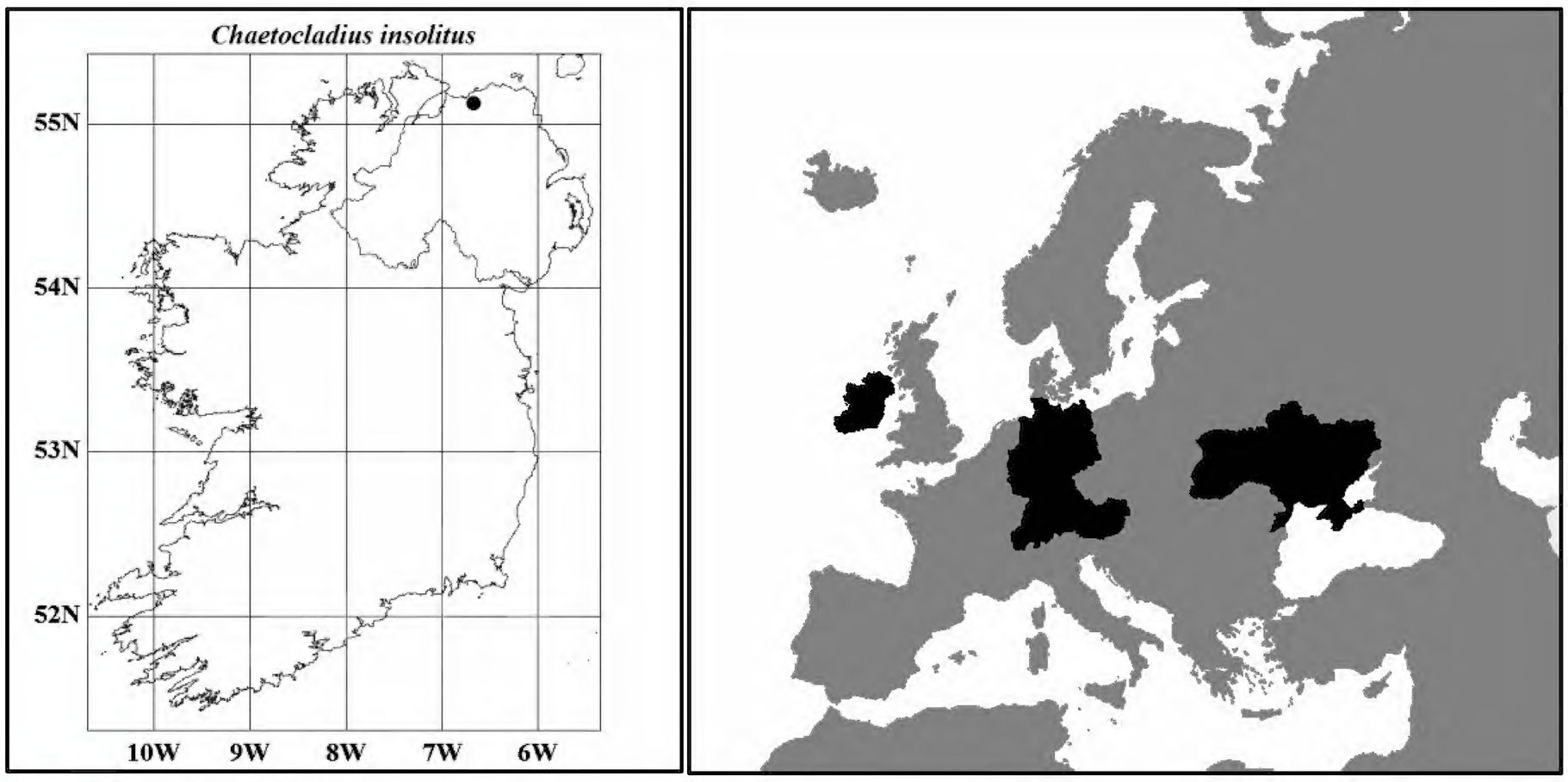
FIGURES 195-196. *Cardiocladius fuscus* Kieffer, 1924.



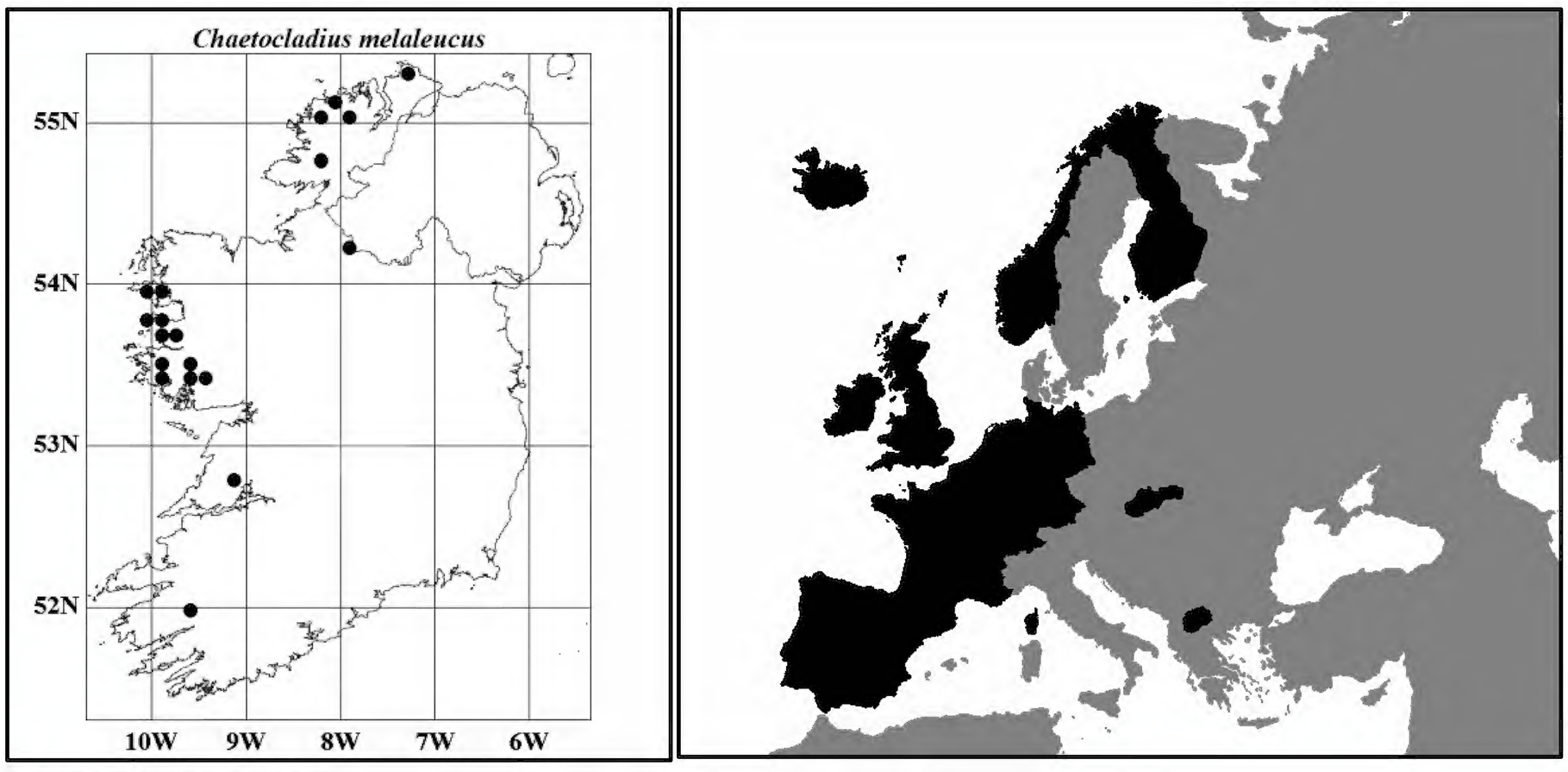
FIGURES 197-198. *Chaetocladius dentiforceps* (Edwards, 1929).



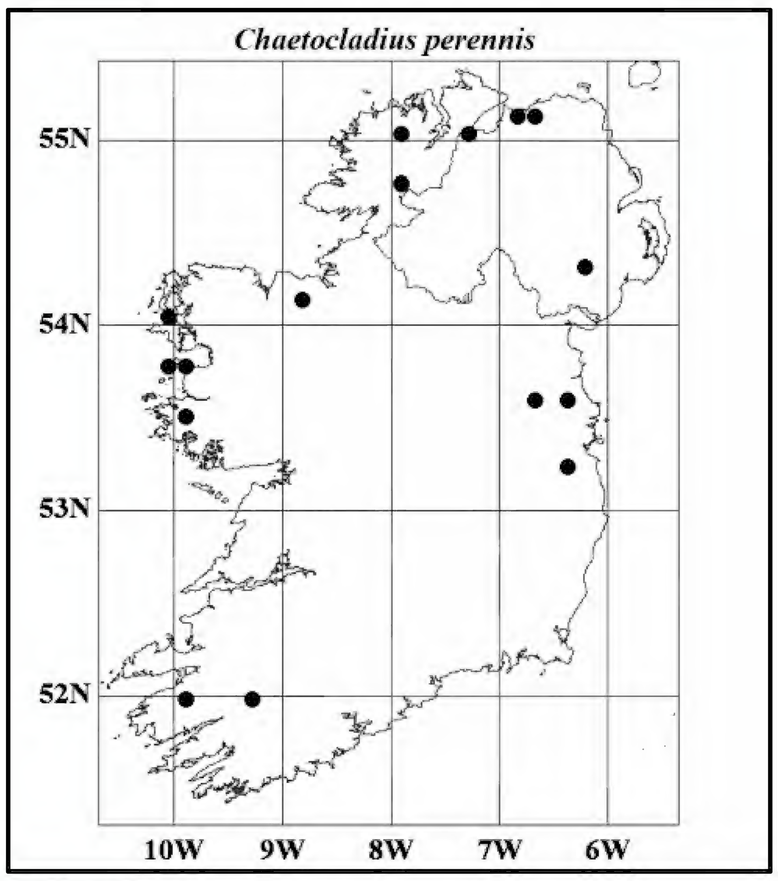
FIGURES 199-200. *Chaetocladius dissipatus* (Edwards, 1929).



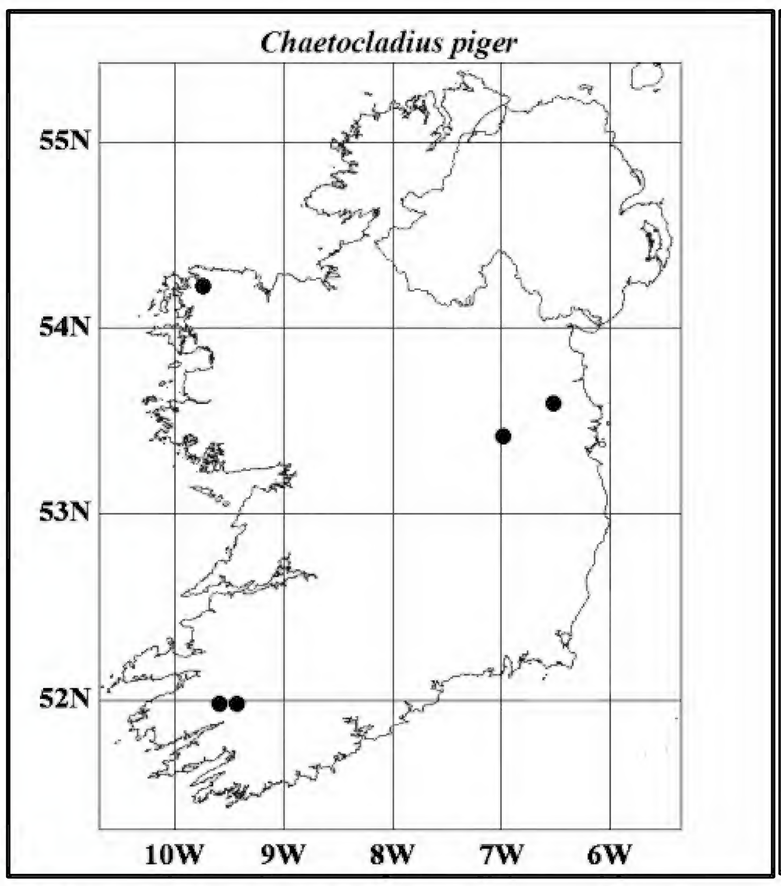
FIGURES 201-202. *Chaetocladius insolitus* Caspers, 1987.

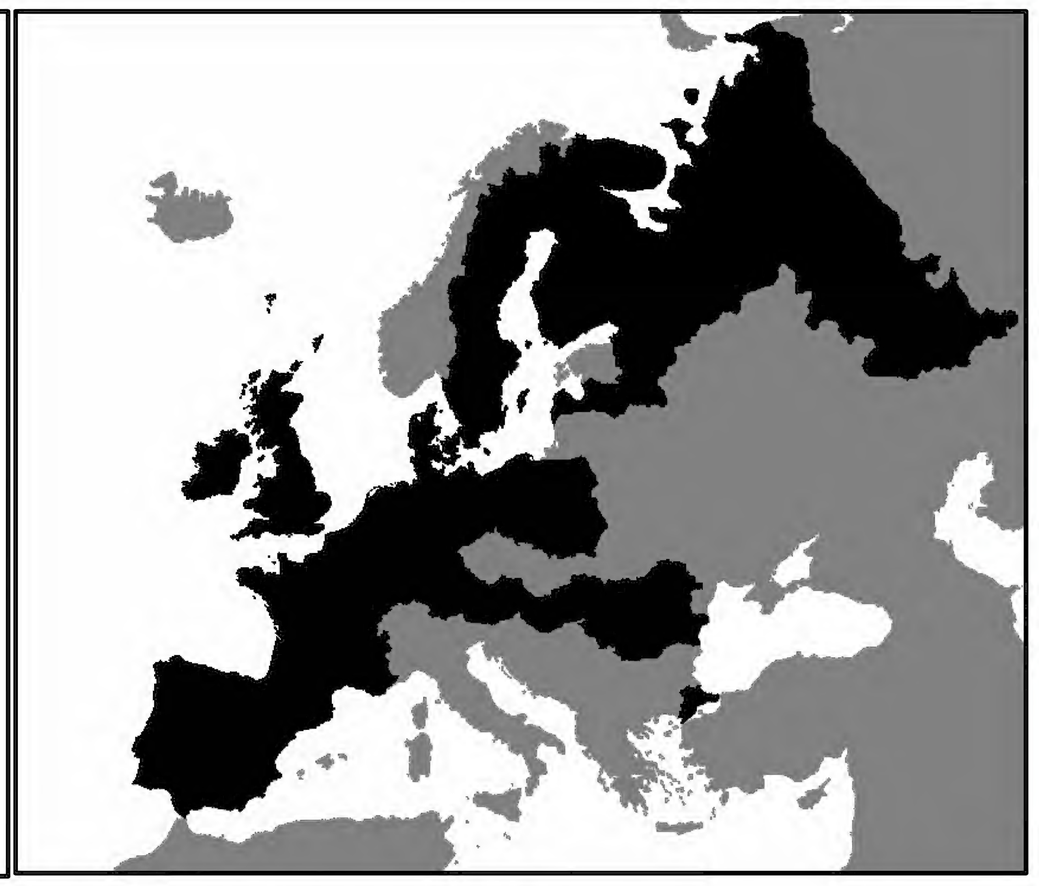


FIGURES 203-204. *Chaetocladius melaleucus* (Meigen, 1818).

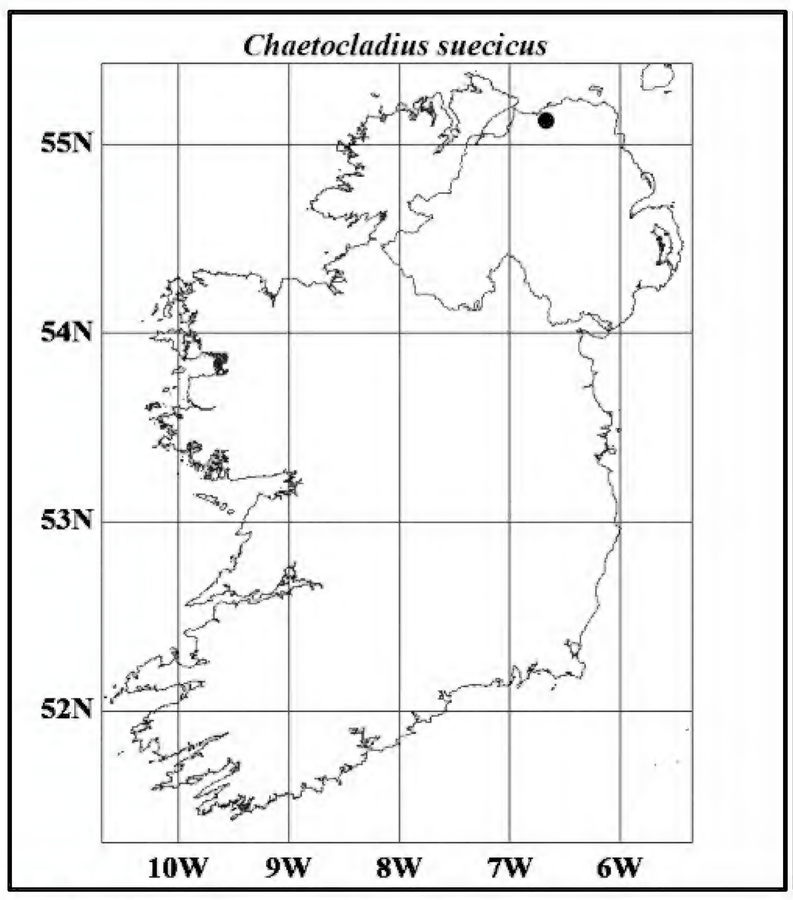


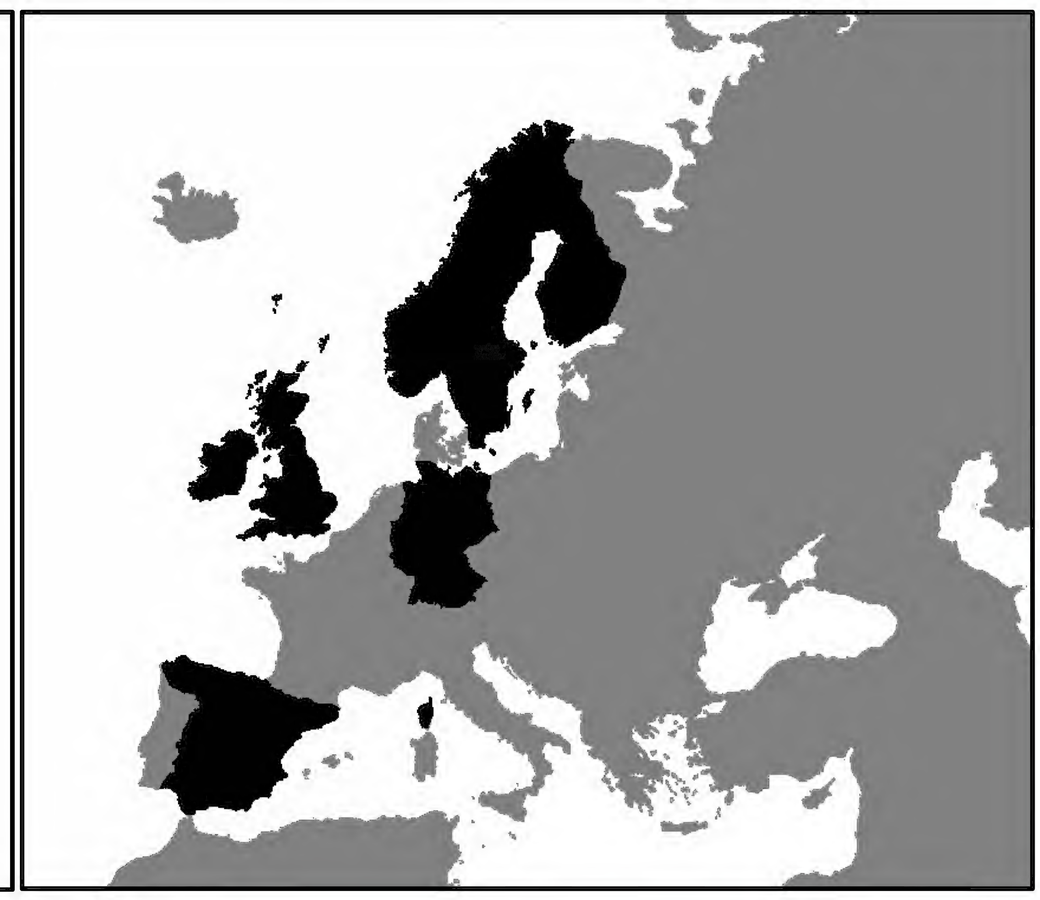
FIGURES 205-206. *Chaetocladius perennis* (Meigen, 1830).



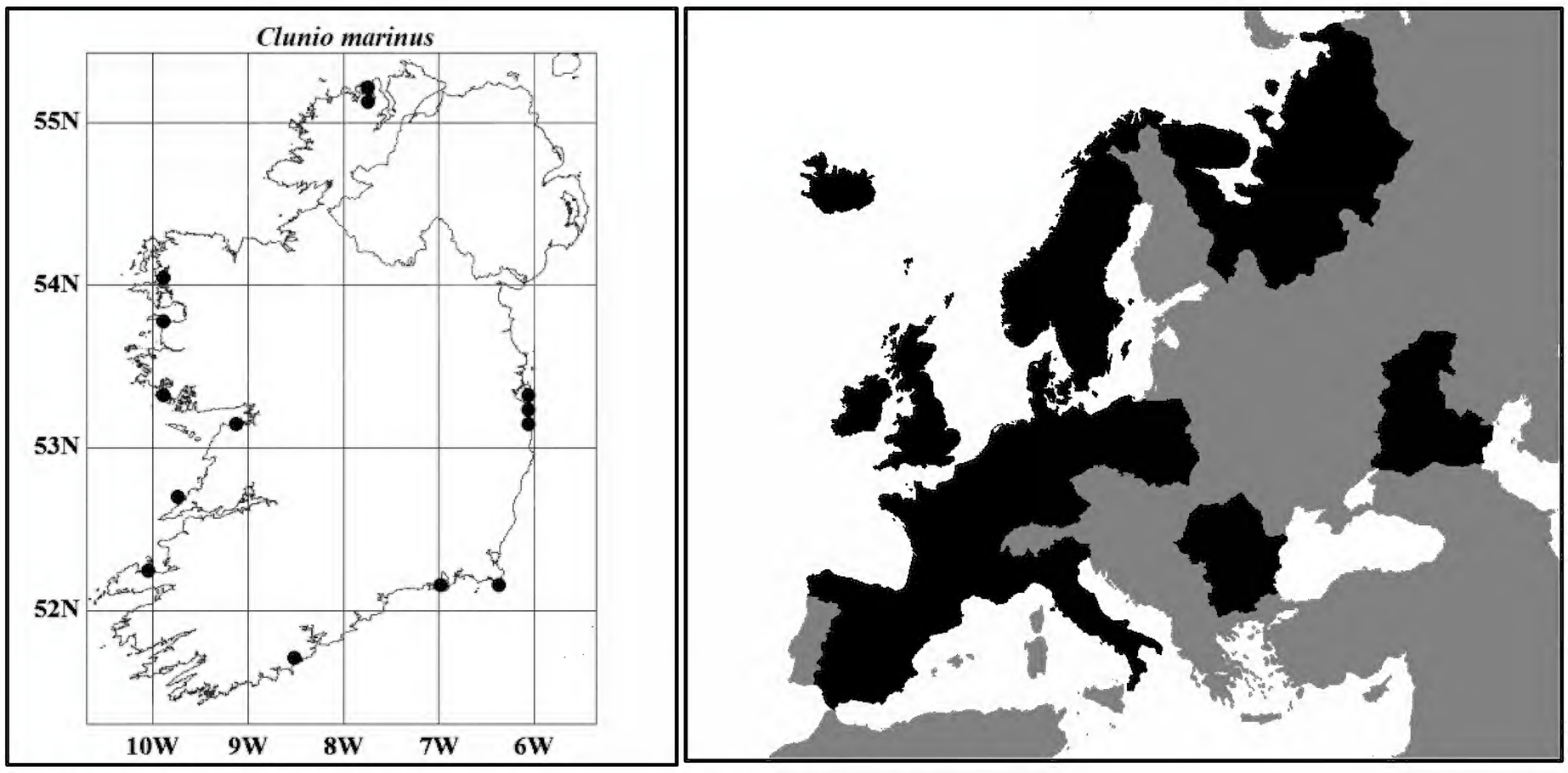


FIGURES 207-208. *Chaetocladius piger* (Goetghebuer, 1913).

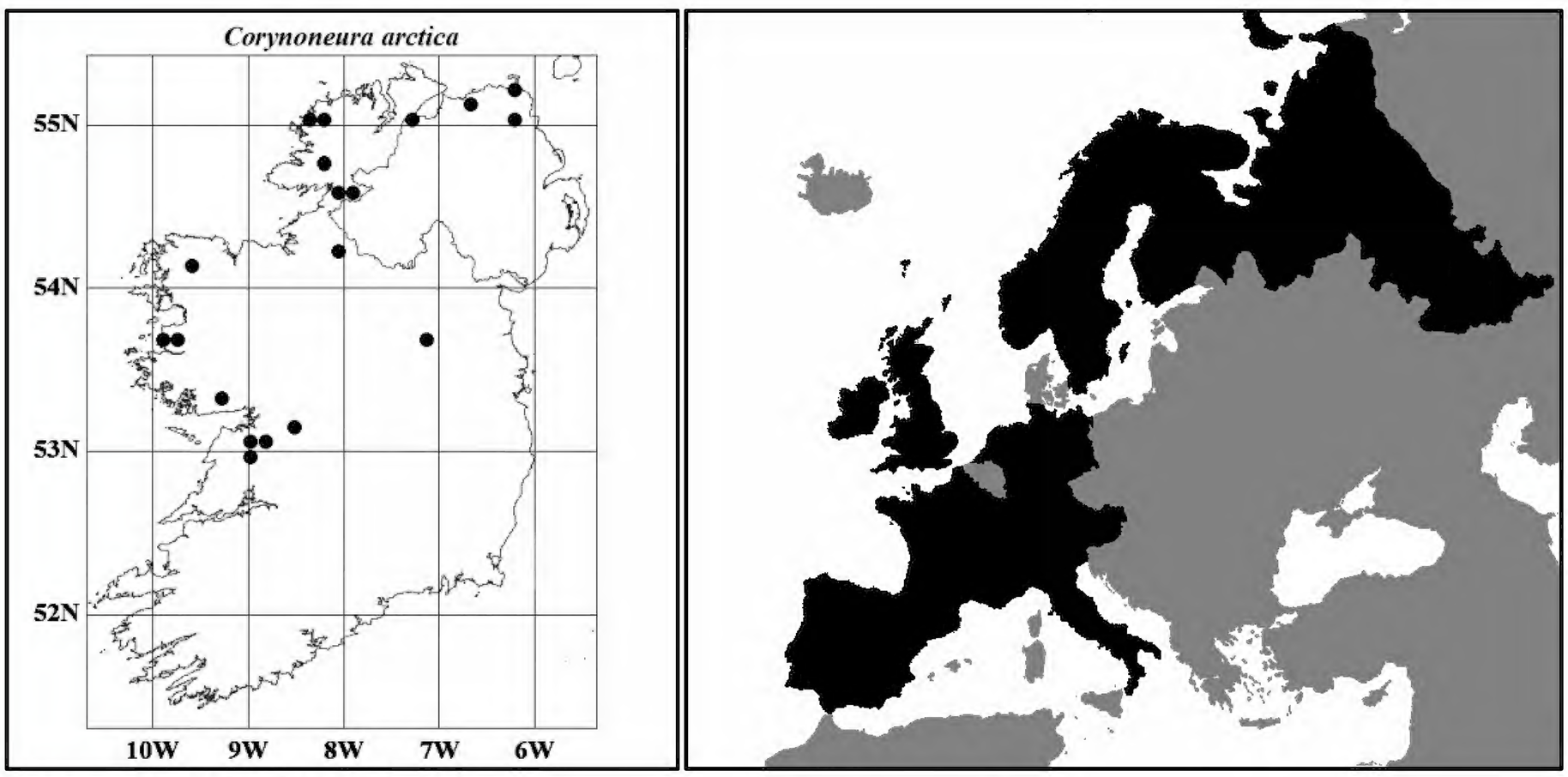




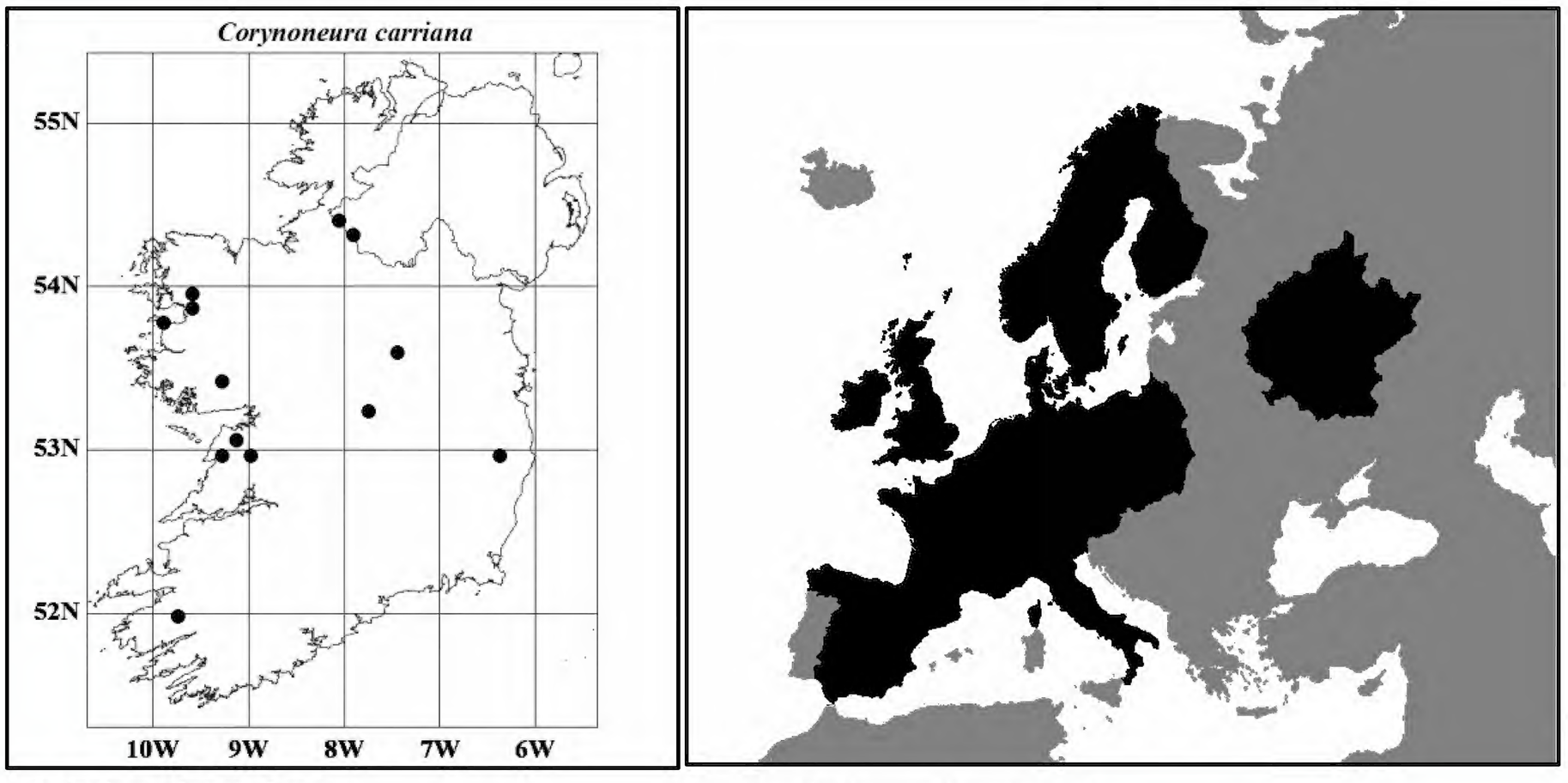
FIGURES 209-210. *Chaetocladius suecicus* (Kieffer, 1916).



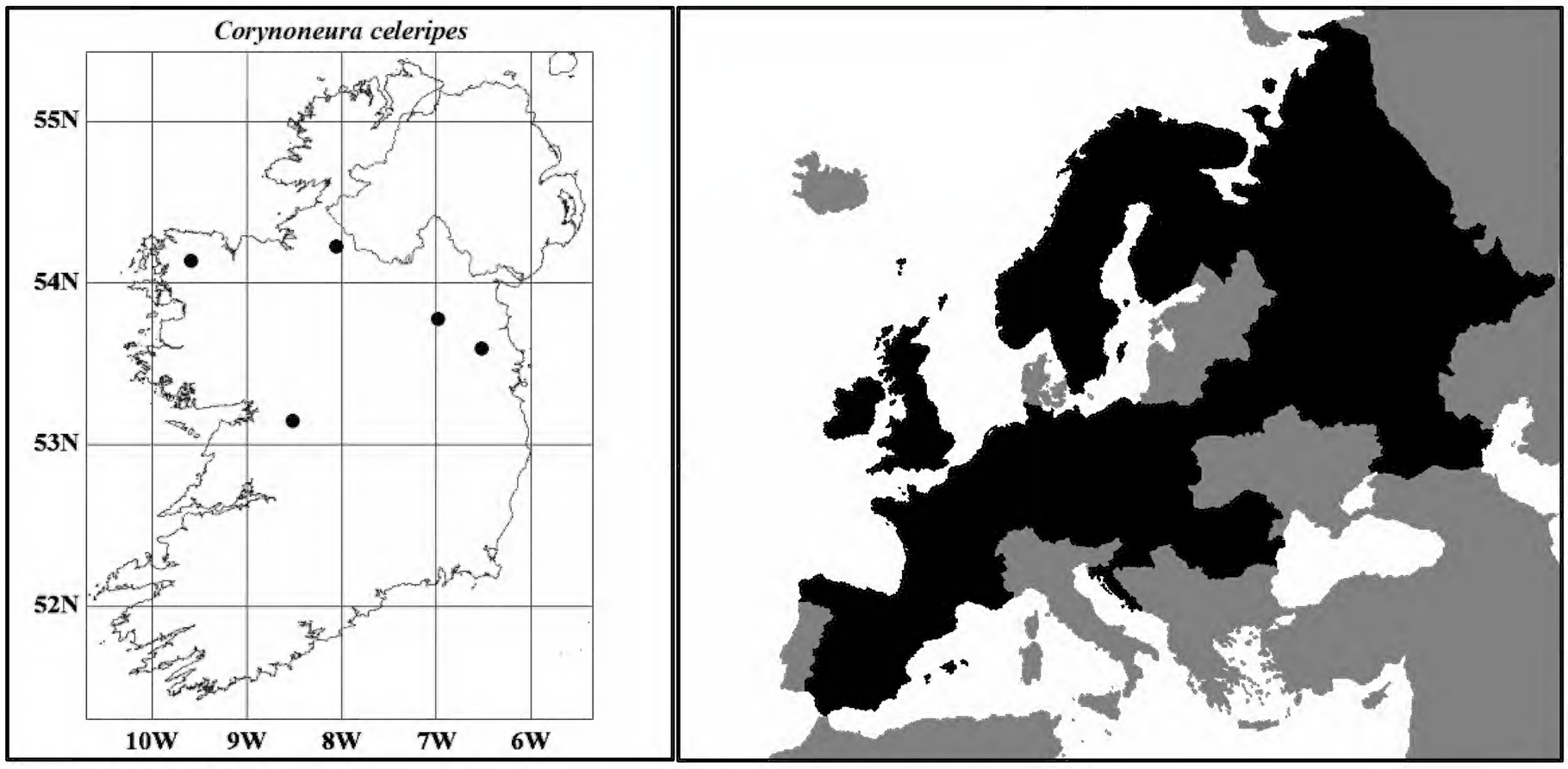
FIGURES 211-212. *Clunio marinus* Haliday, 1855.



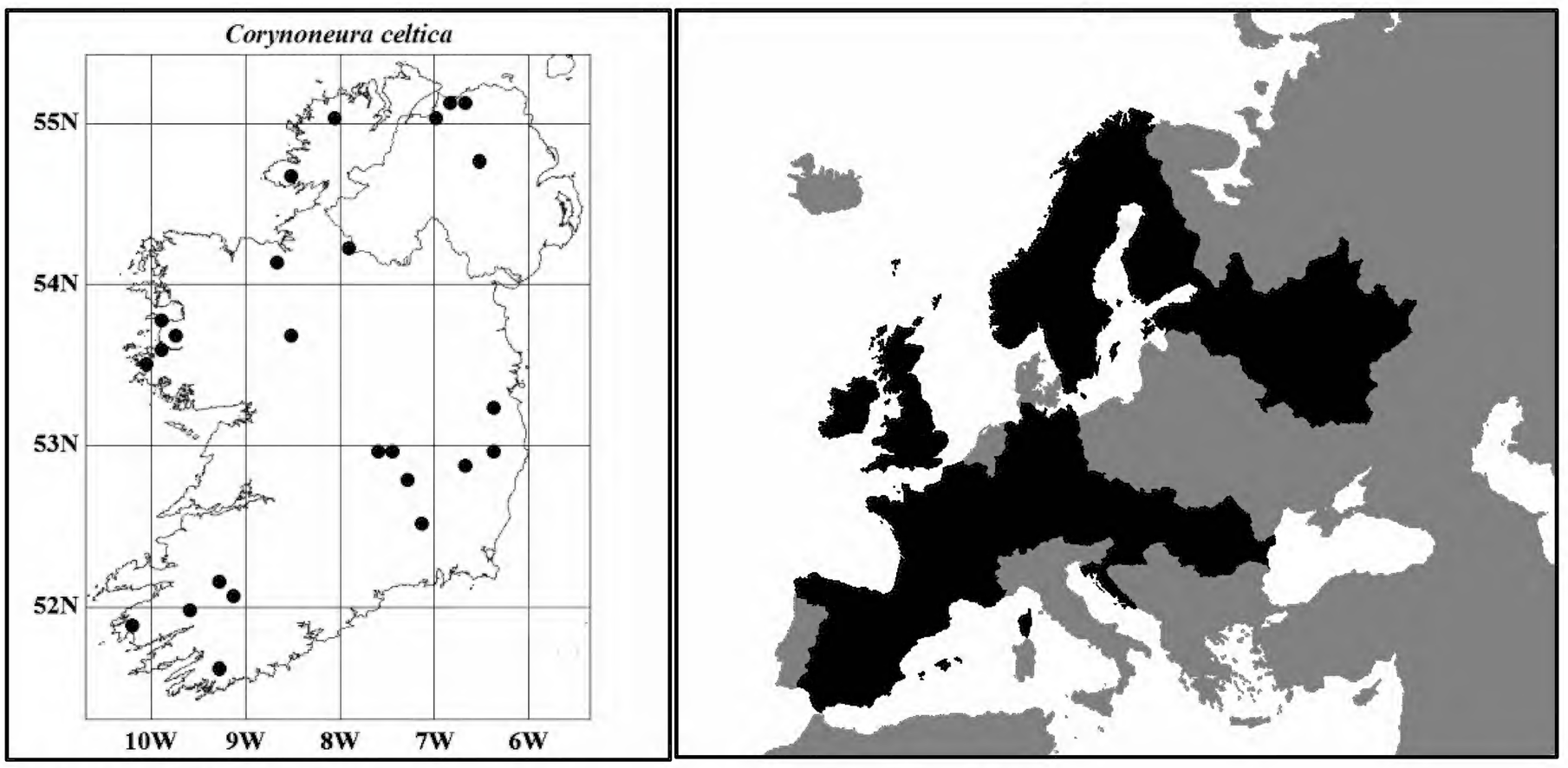
FIGURES 213-214. *Corynoneura arctica* Kieffer, 1923.



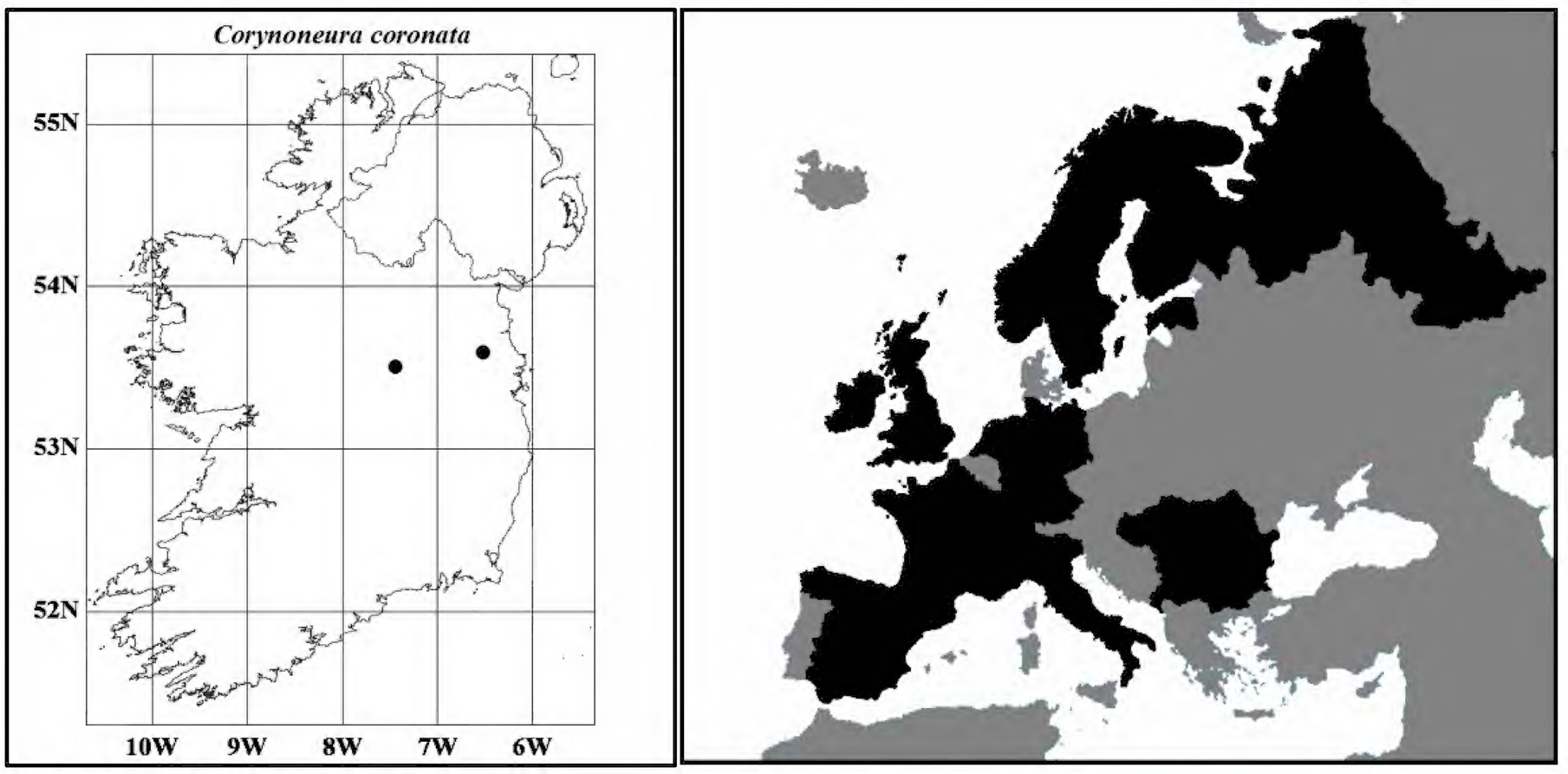
FIGURES 215-216. *Corynoneura carriana* Edwards, 1924.



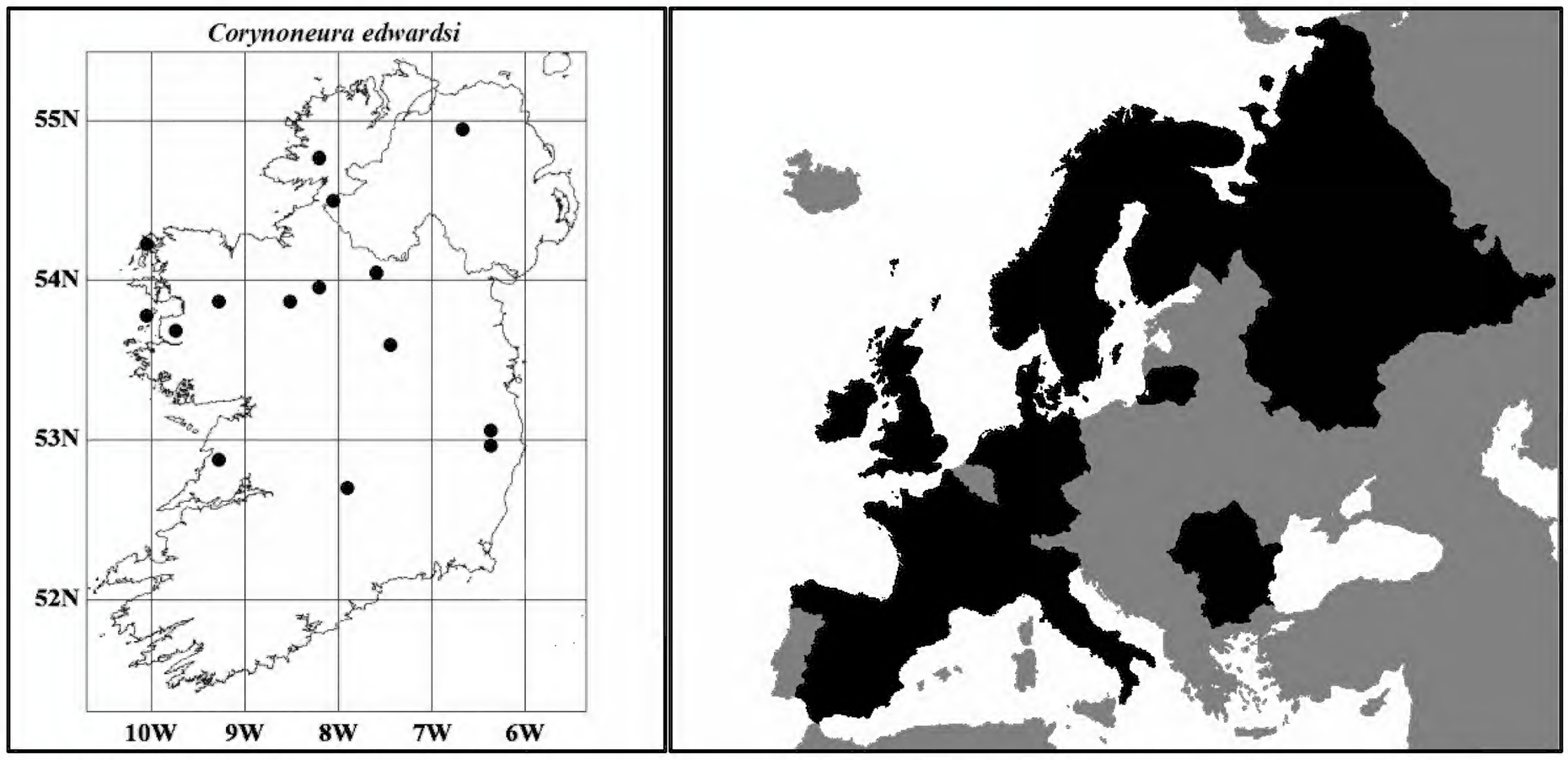
FIGURES 217-218. *Corynoneura celeripes* Winnertz, 1852.



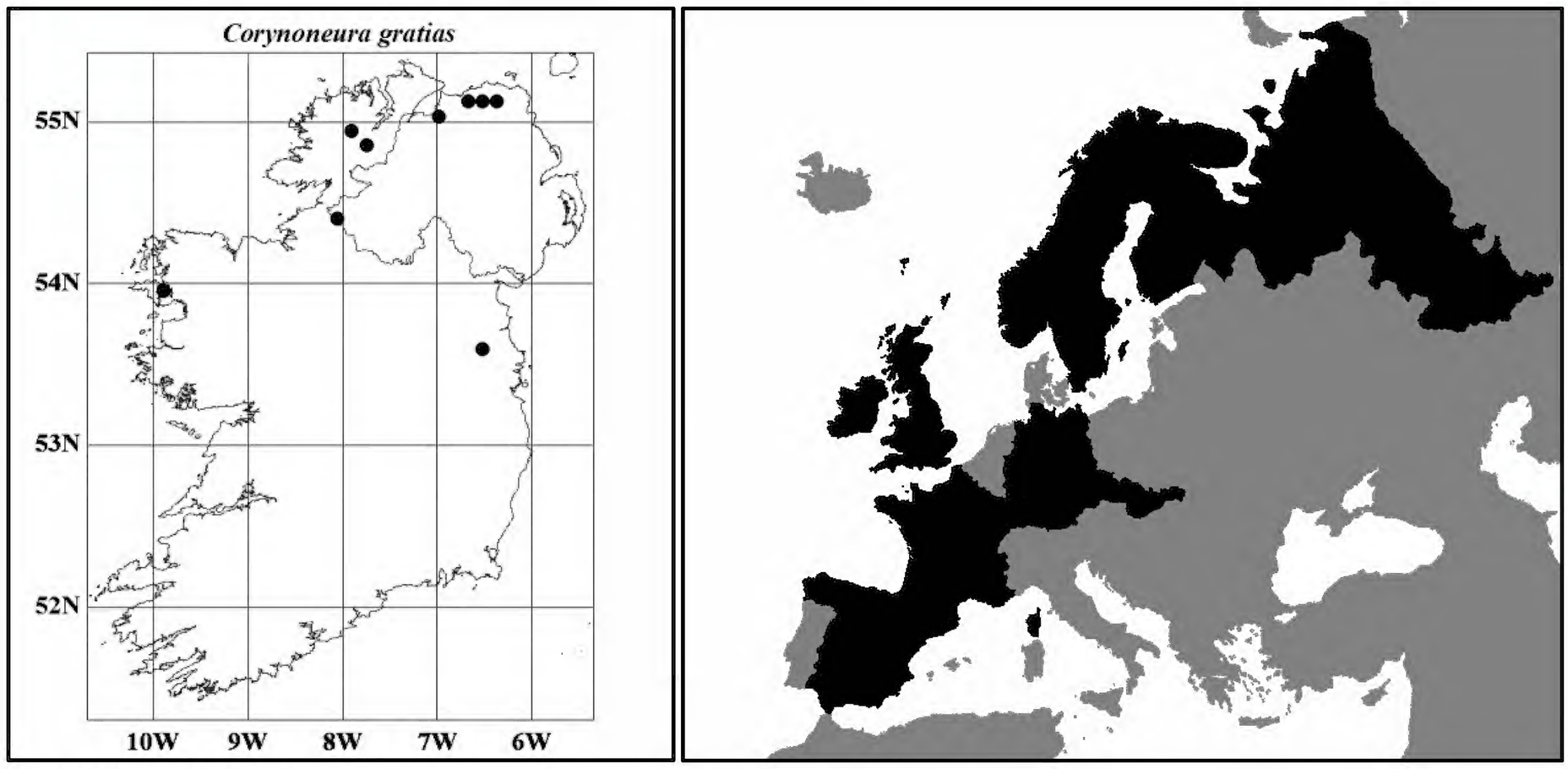
FIGURES 219-220. *Corynoneura celtica* Edwards, 1924.



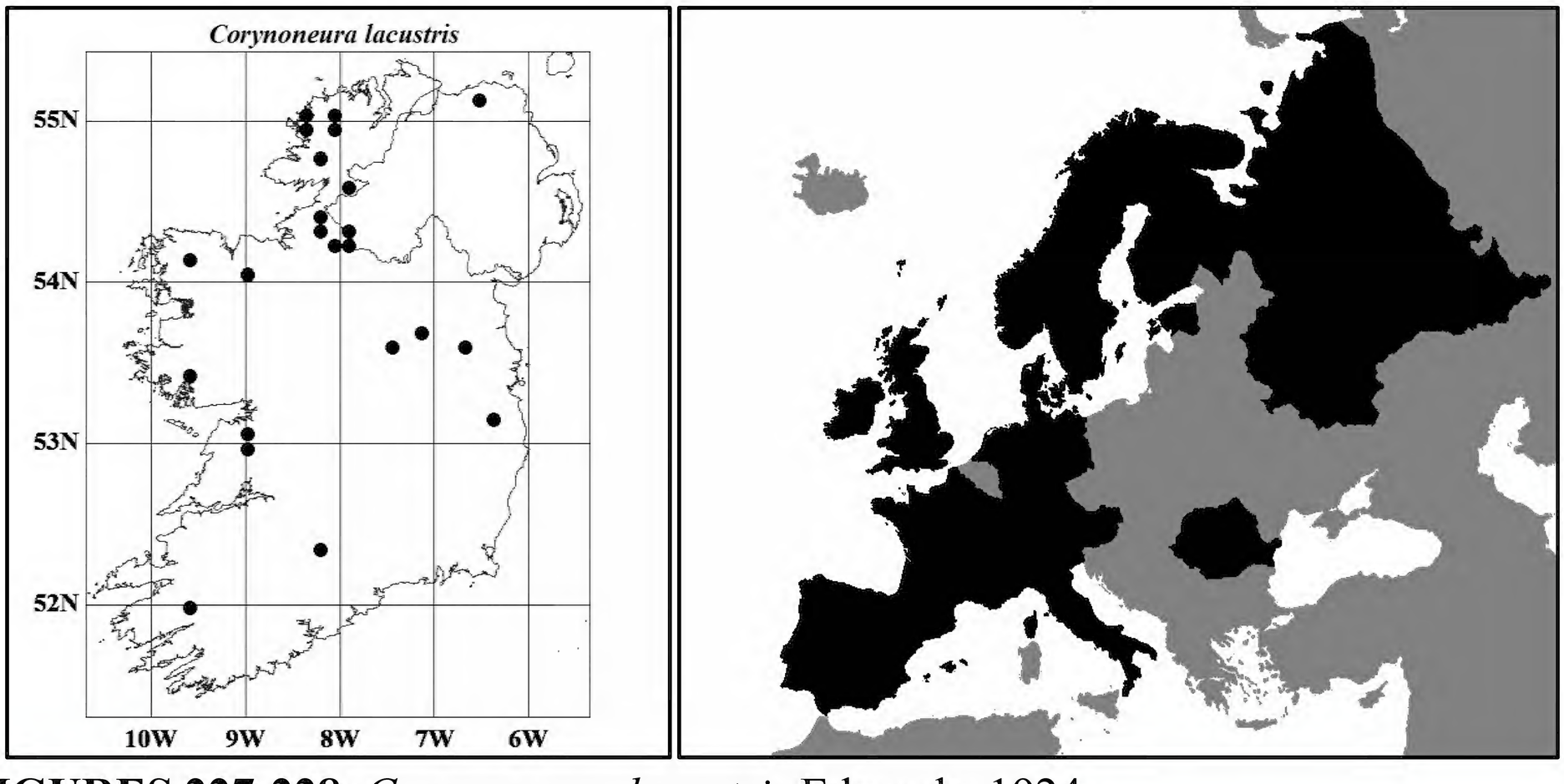
FIGURES 221-222. *Corynoneura coronata* Edwards, 1924.



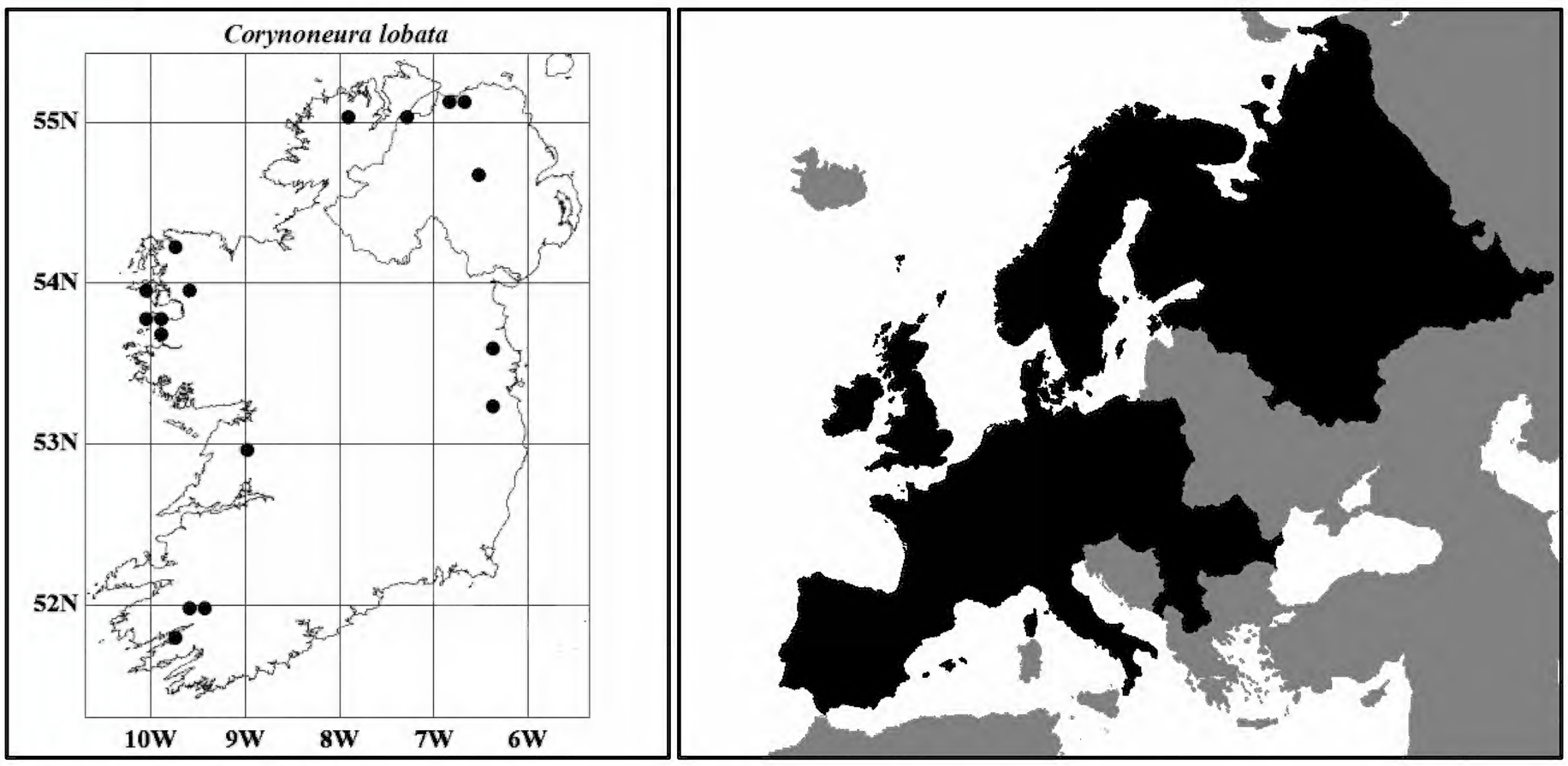
FIGURES 223-224. *Corynoneura edwardsi* Brundin, 1949.



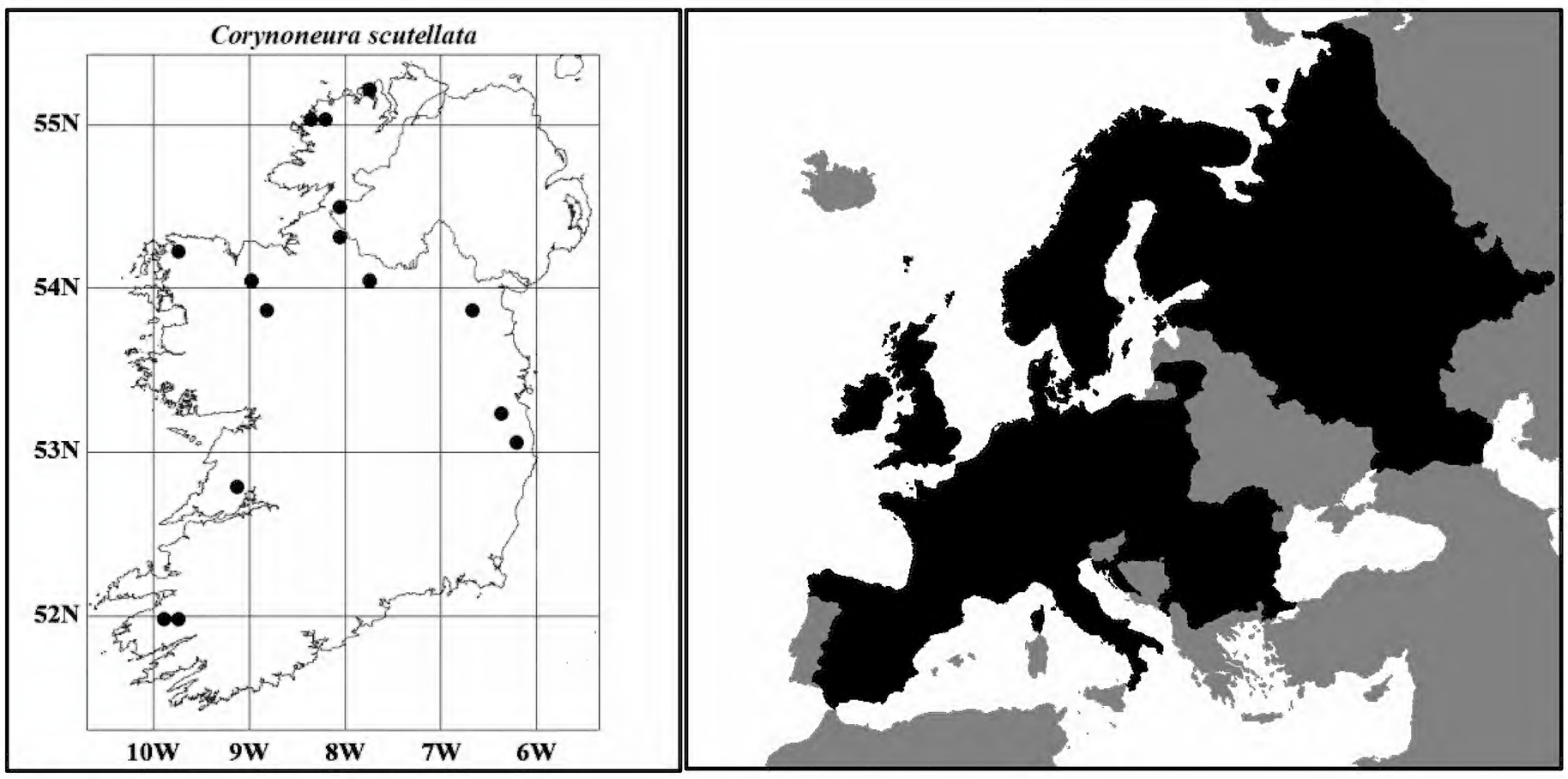
FIGURES 225-226. *Corynoneura gratias* Schlee, 1968.



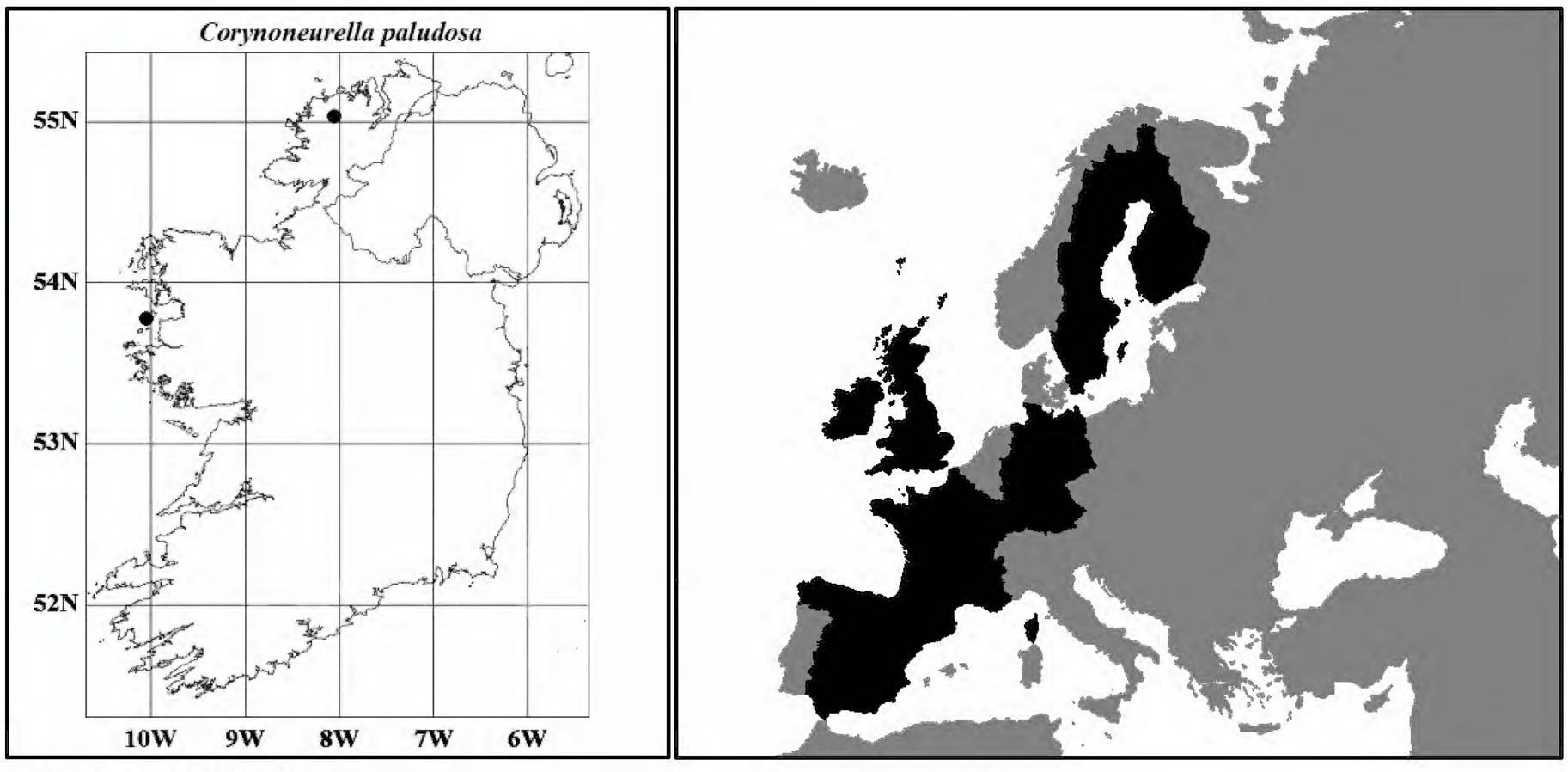
FIGURES 227-228. *Corynoneura lacustris* Edwards, 1924.



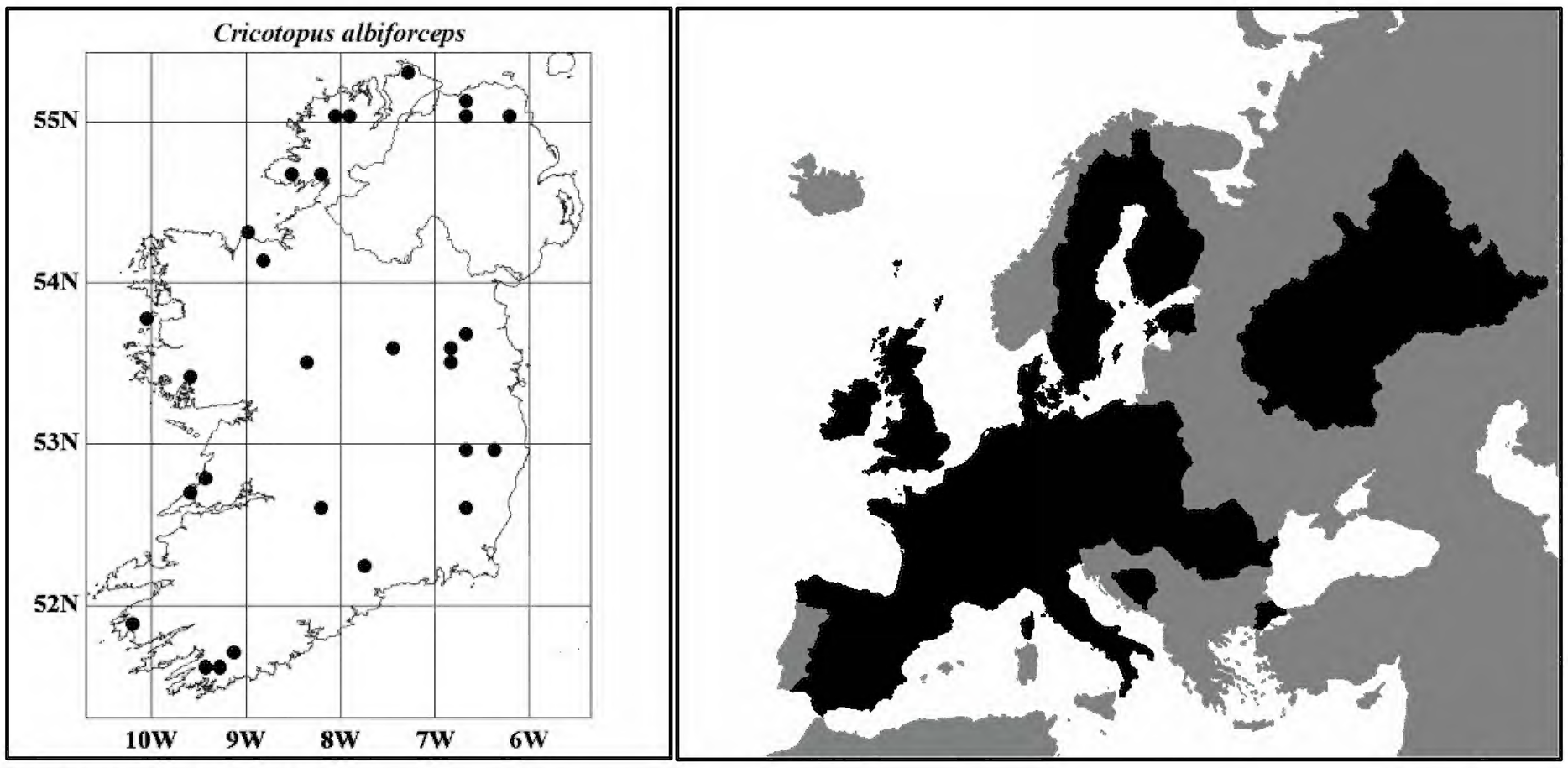
FIGURES 229-230. *Corynoneura lobata* Edwards, 1924.



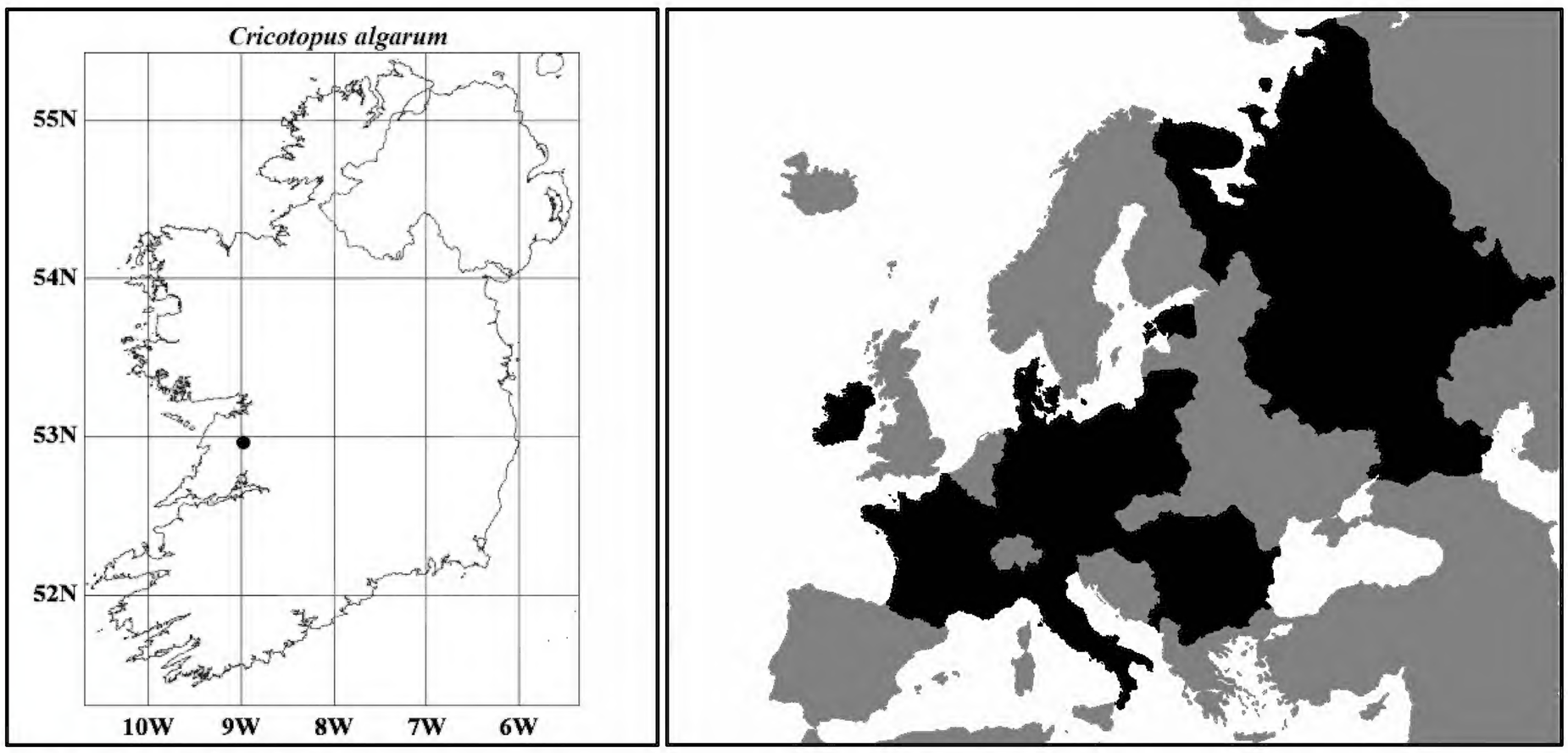
FIGURES 231-232. *Corynoneura scutellata* Winnertz, 1846.



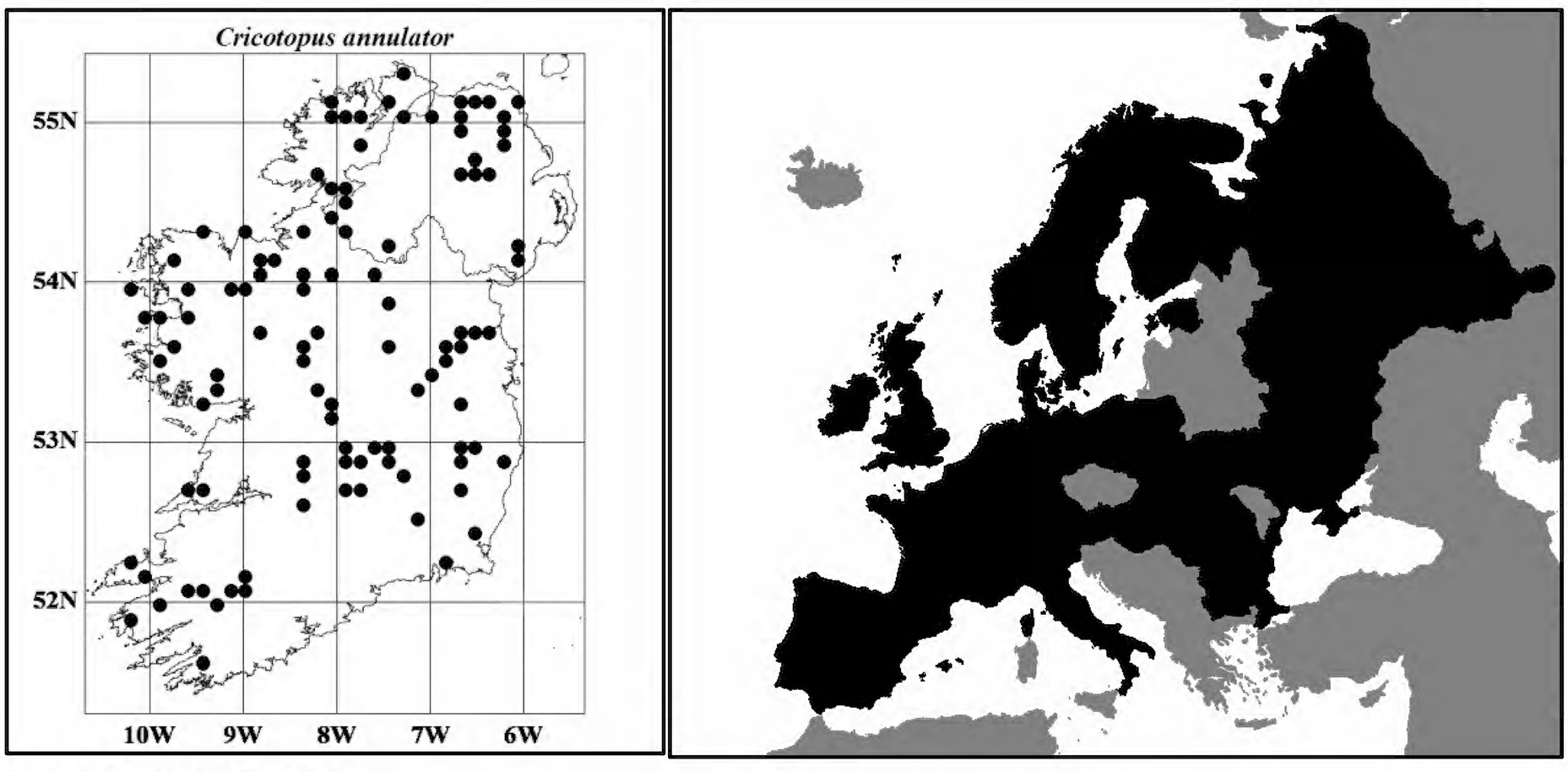
FIGURES 233-234. *Corynoneurella paludosa* Brundin, 1949.



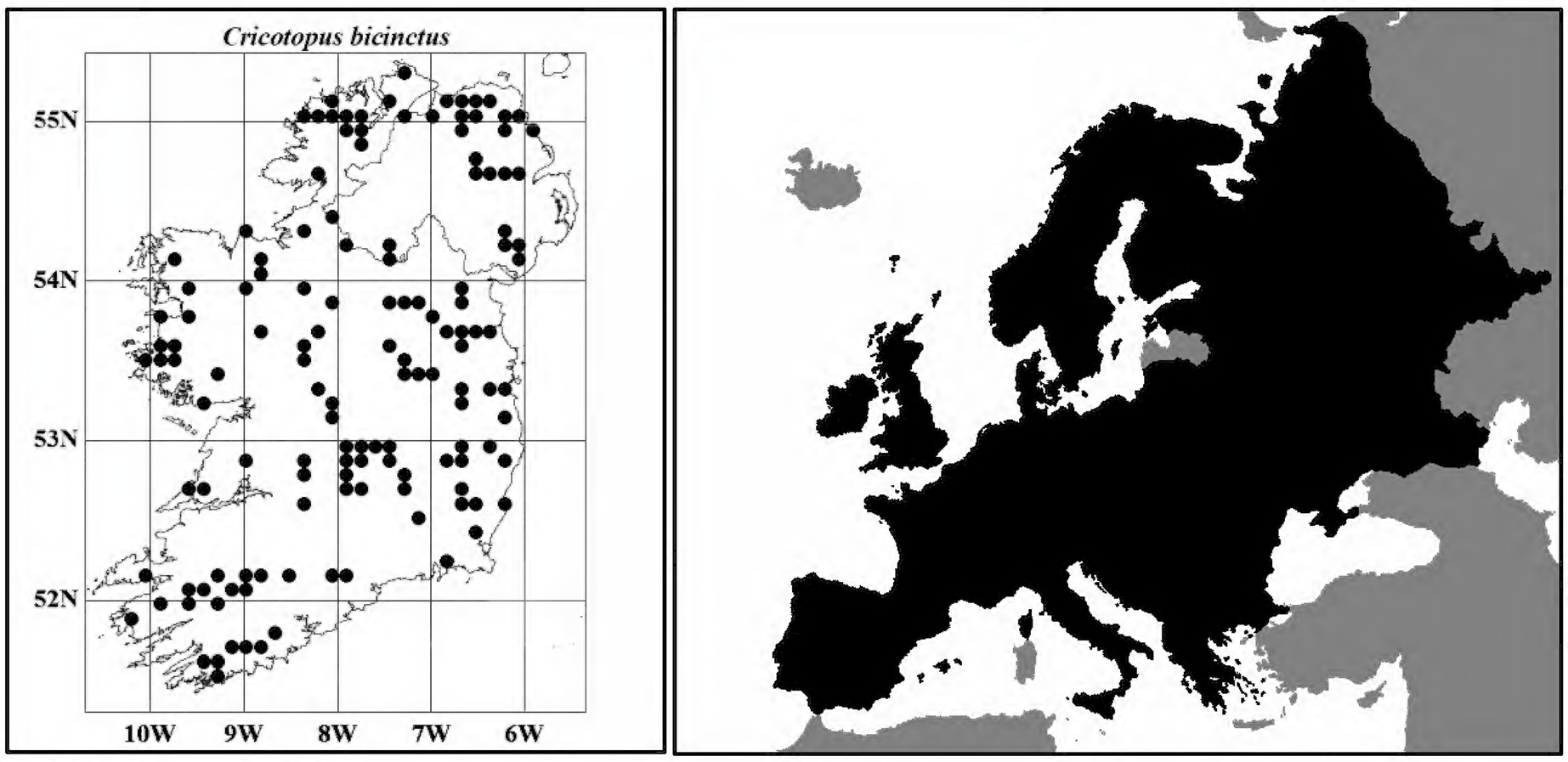
FIGURES 235-236. *Cricotopus albiforceps* (Kieffer, 1916).



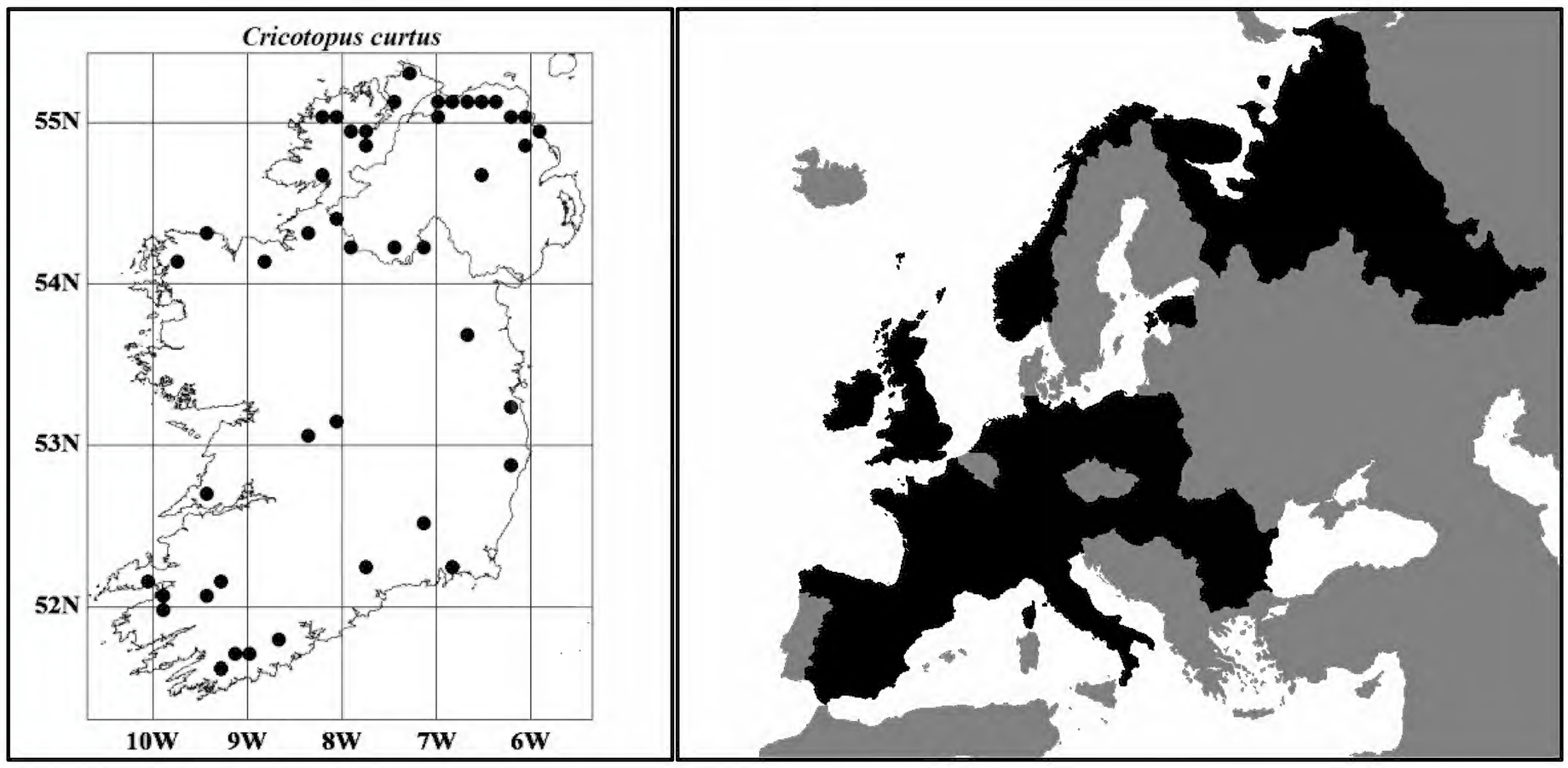
FIGURES 237-238. *Cricotopus algarum* (Kieffer, 1911).



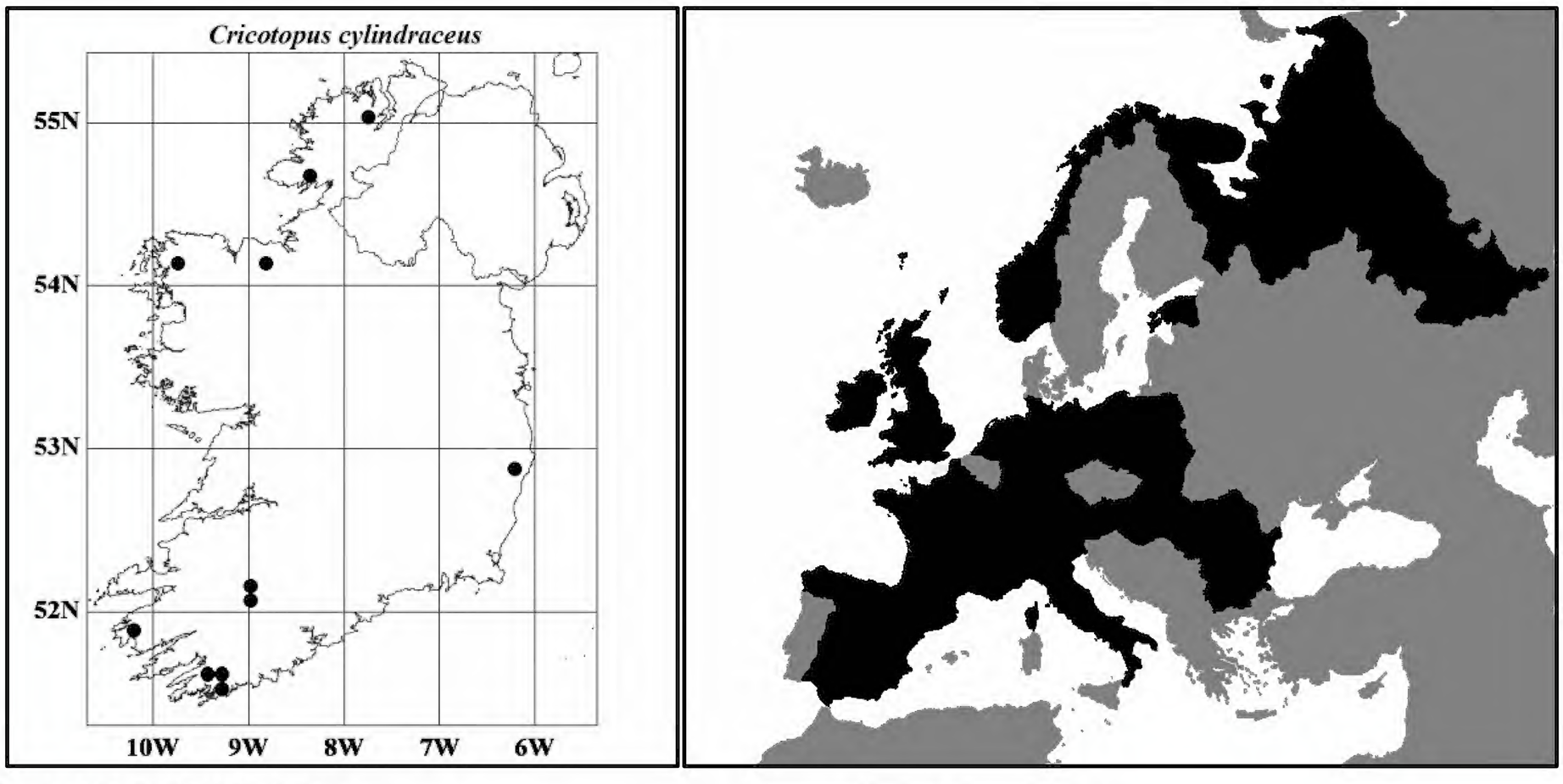
FIGURES 239-240. *Cricotopus annulator* Goetghebuer, 1927.



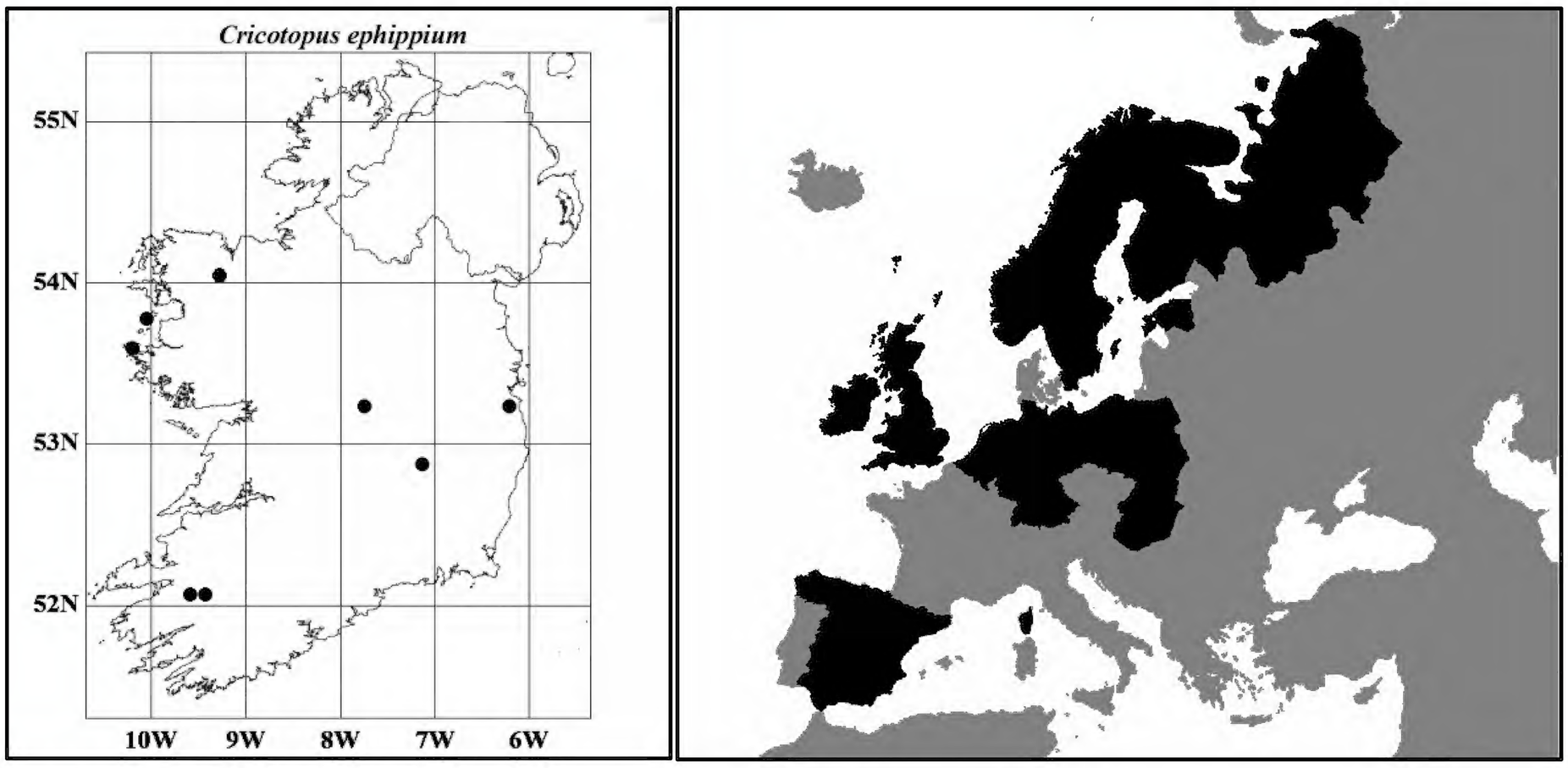
FIGURES 241-242. *Cricotopus bicinctus* (Meigen, 1818).



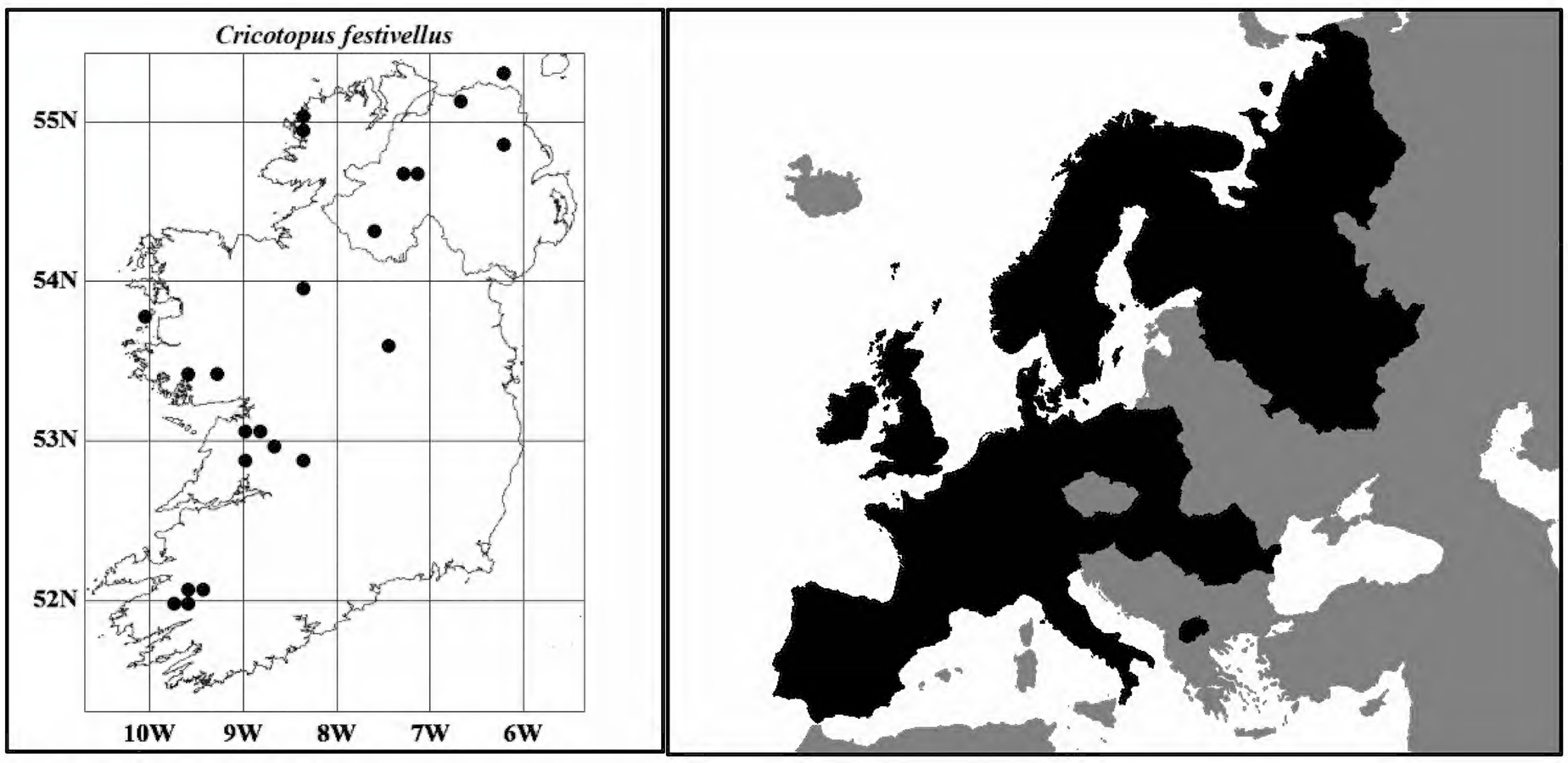
FIGURES 243-244. *Cricotopus curtus* Hirvenoja, 1973.



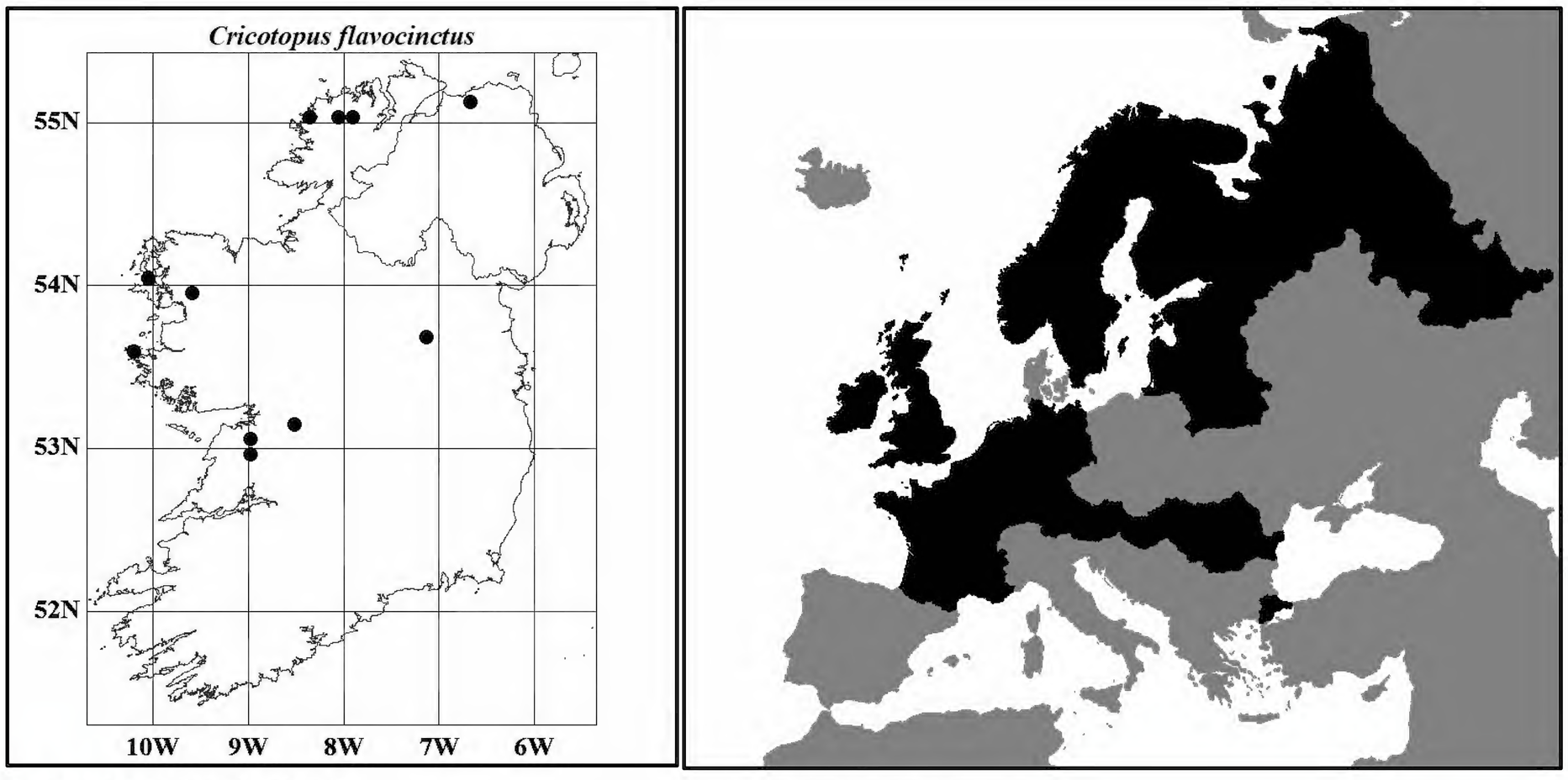
FIGURES 245-246. *Cricotopus cylindraceus* (Kieffer, 1908).



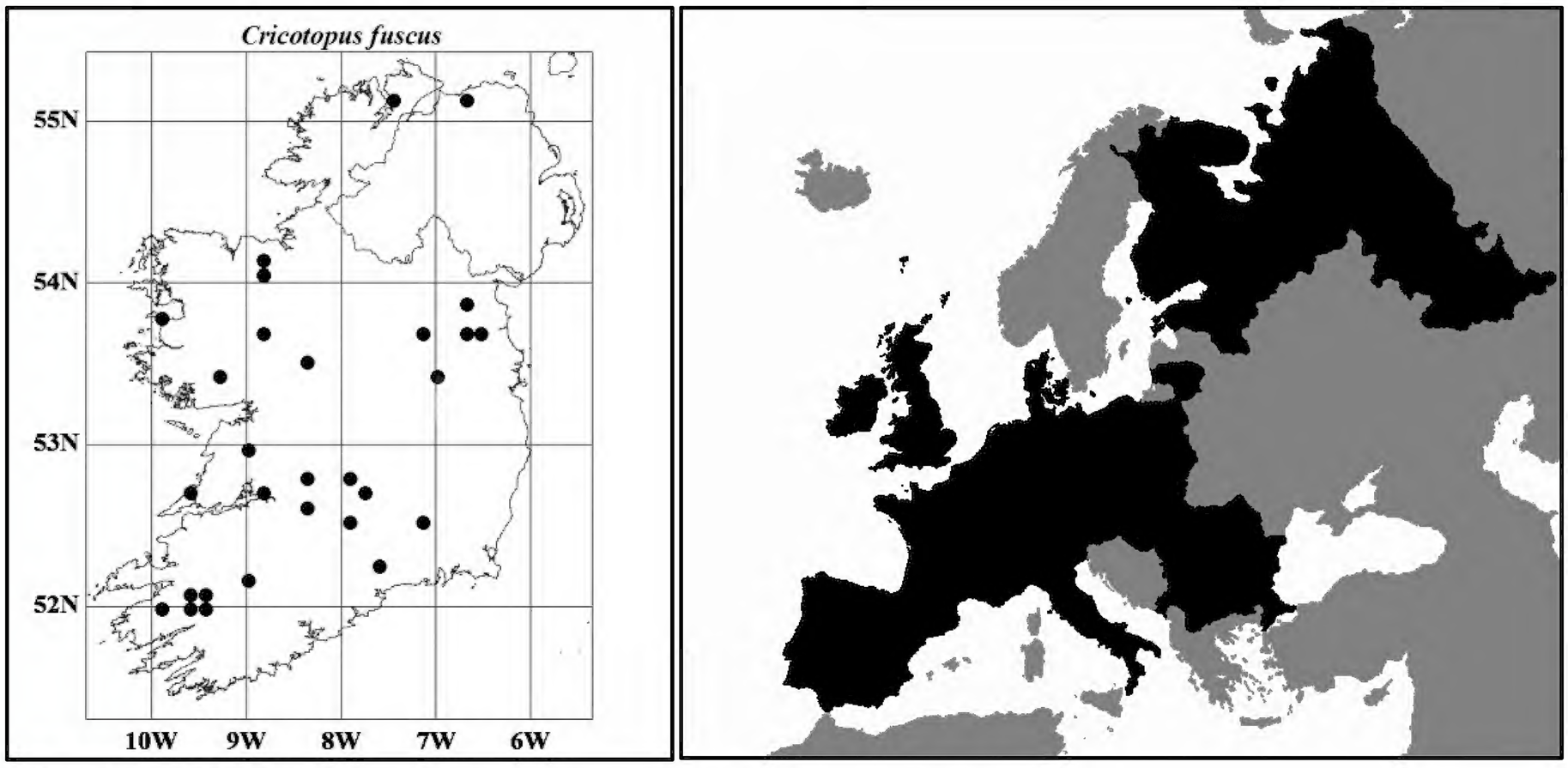
FIGURES 247-248. *Cricotopus ephippium* (Zetterstedt, 1838).



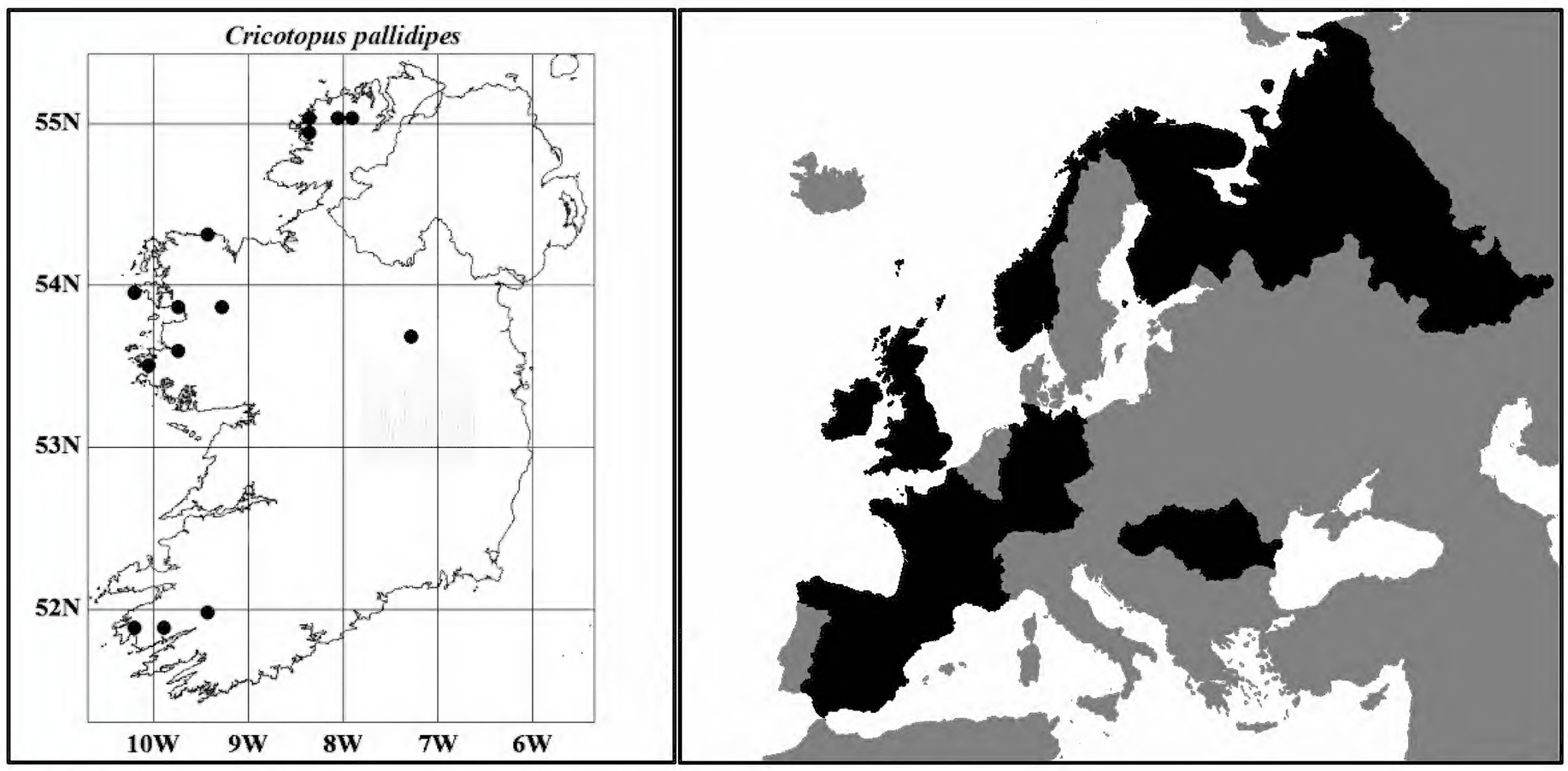
FIGURES 249-250. *Cricotopus festivellus* (Kieffer, 1906).



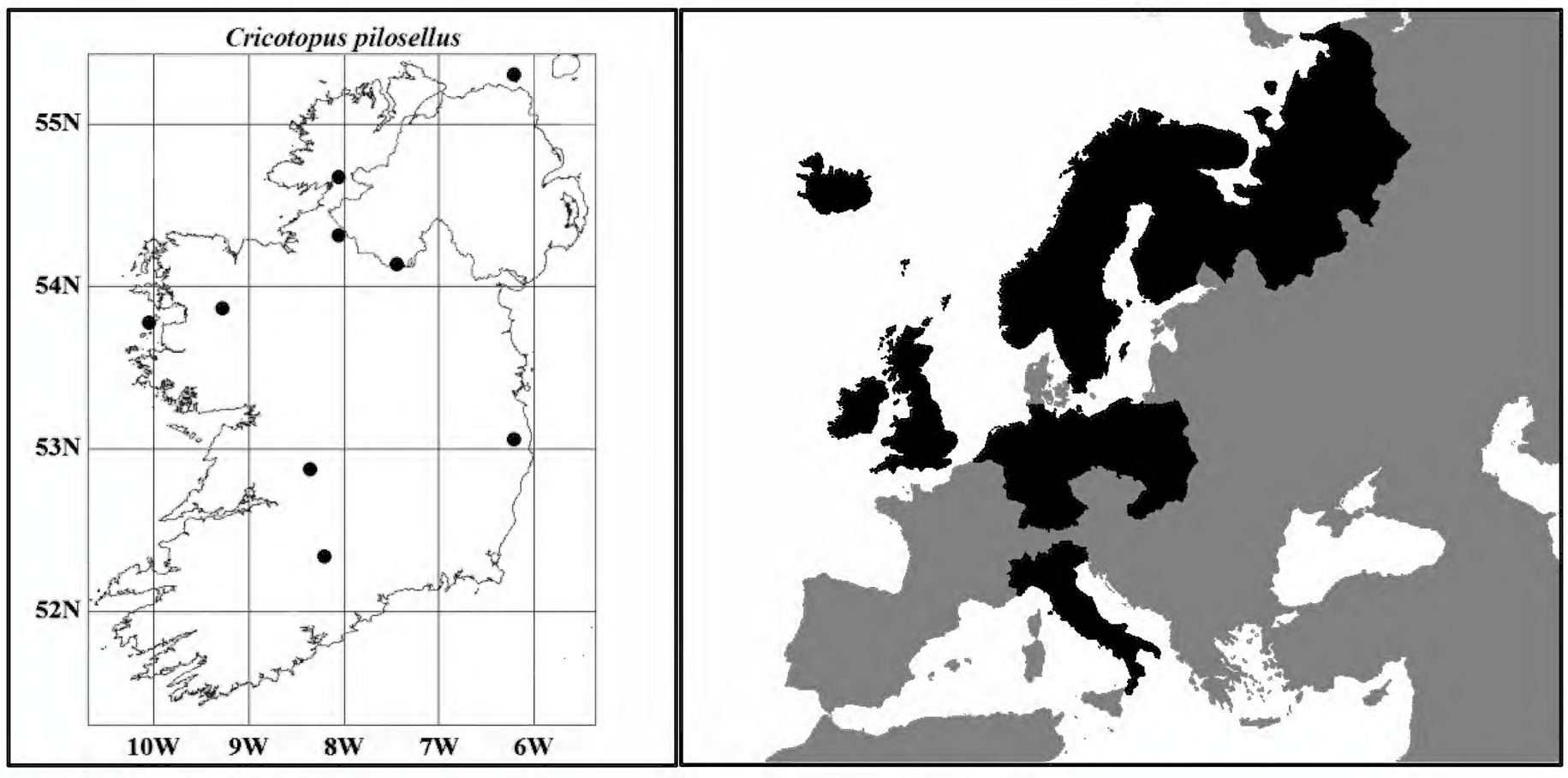
FIGURES 251-252. *Cricotopus flavocinctus* (Kieffer, 1924).



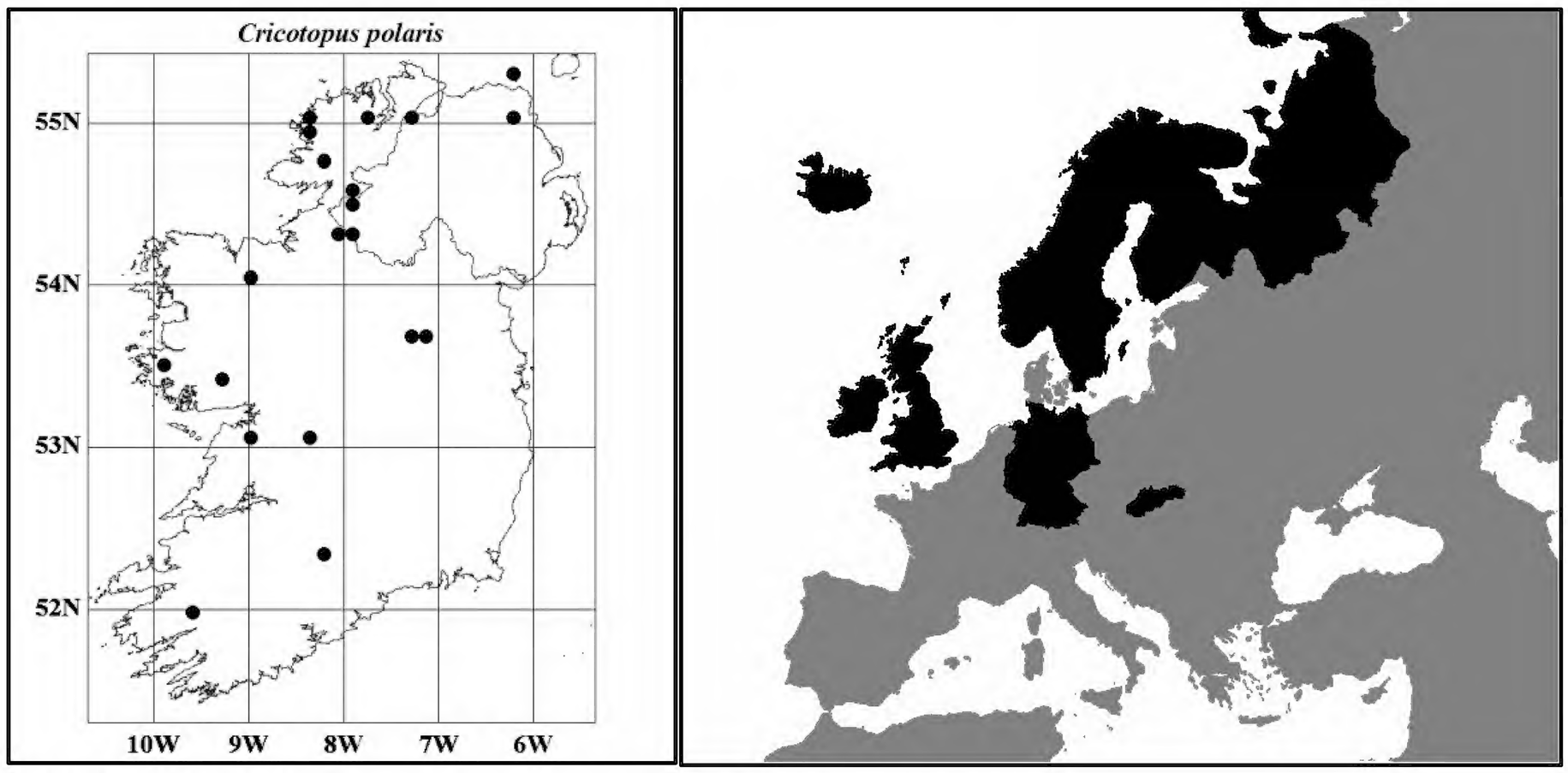
FIGURES 253-254. *Cricotopus fuscus* (Kieffer, 1909).



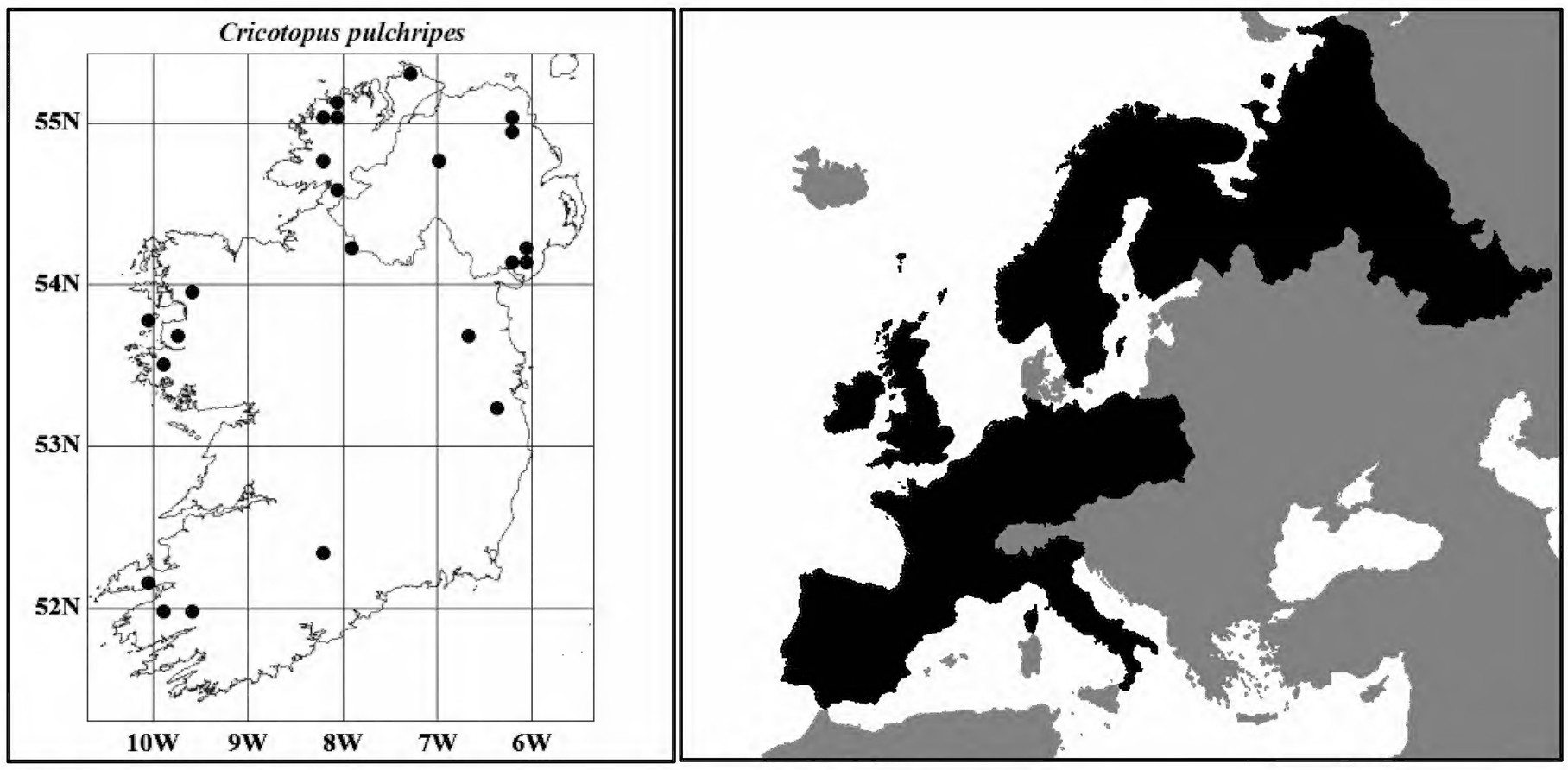
FIGURES 255-256. *Cricotopus pallidipes* Edwards, 1929.



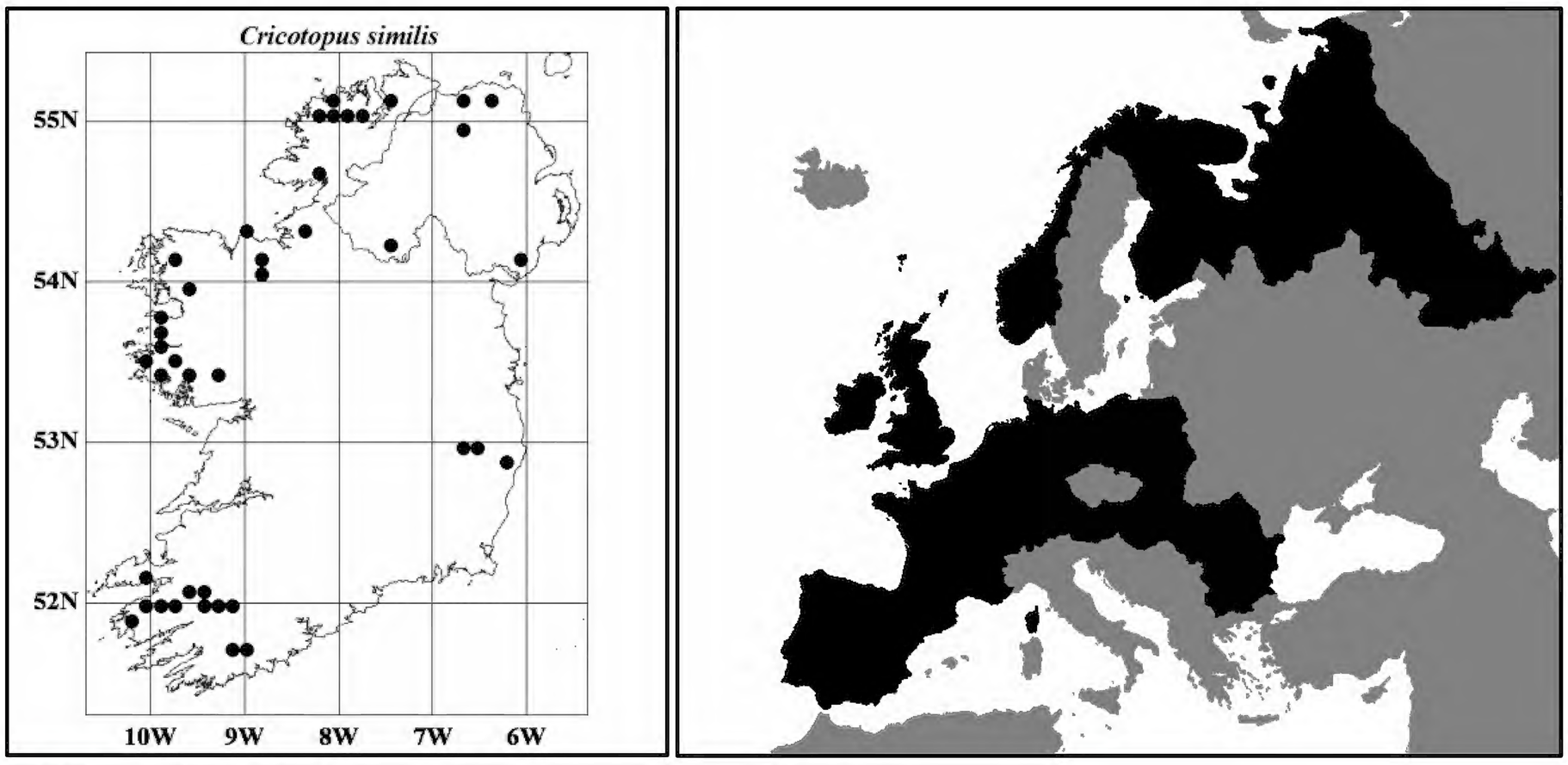
FIGURES 257-258. *Cricotopus pilosellus* Brundin, 1956.



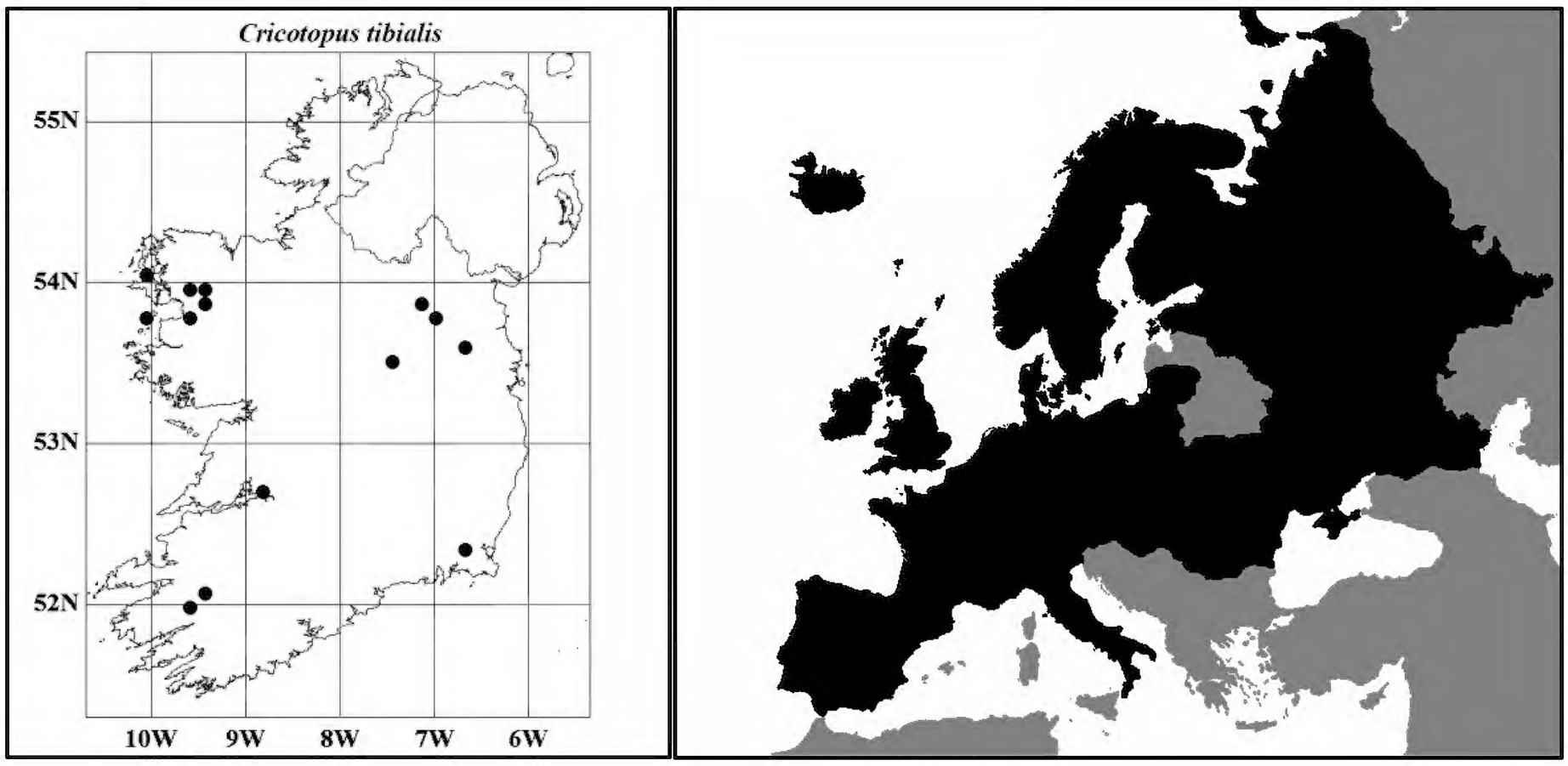
FIGURES 259-260. *Cricotopus polaris* Kieffer, 1926.



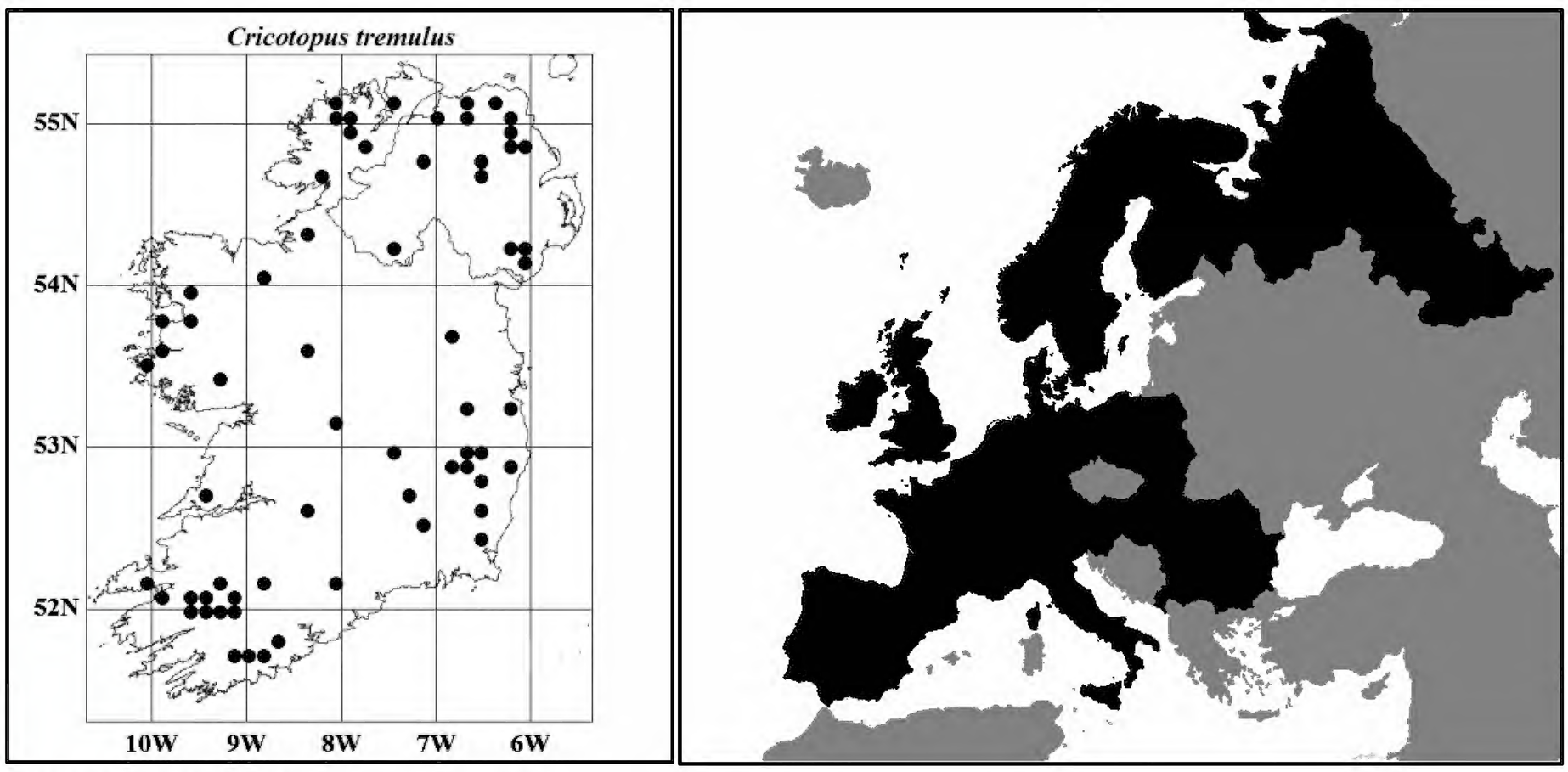
FIGURES 261-262. *Cricotopus pulchripes* Verrall, 1912.



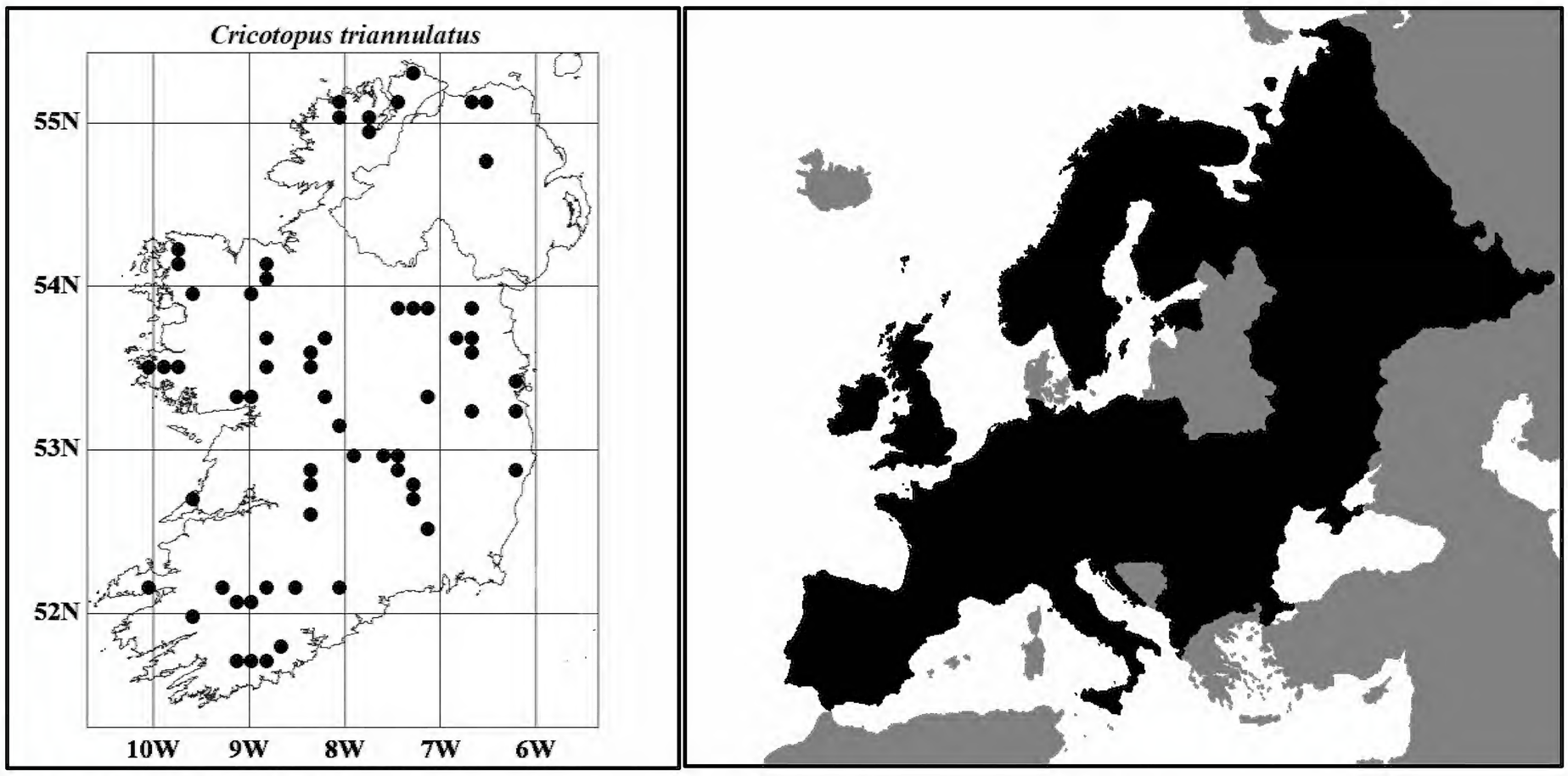
FIGURES 263-264. *Cricotopus similis* Goetghebuer, 1921.



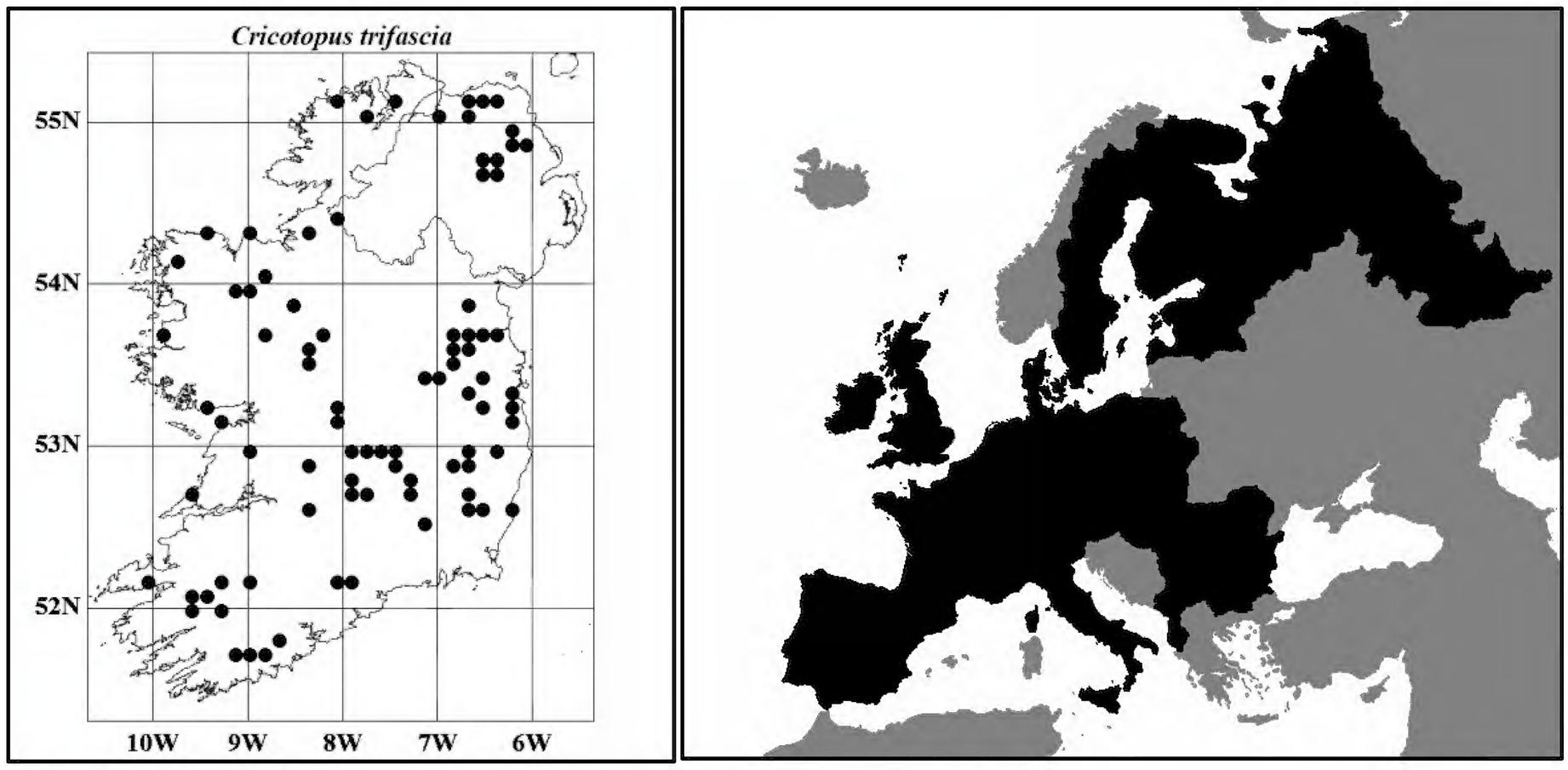
FIGURES 265-266. *Cricotopus tibialis* (Meigen, 1804).



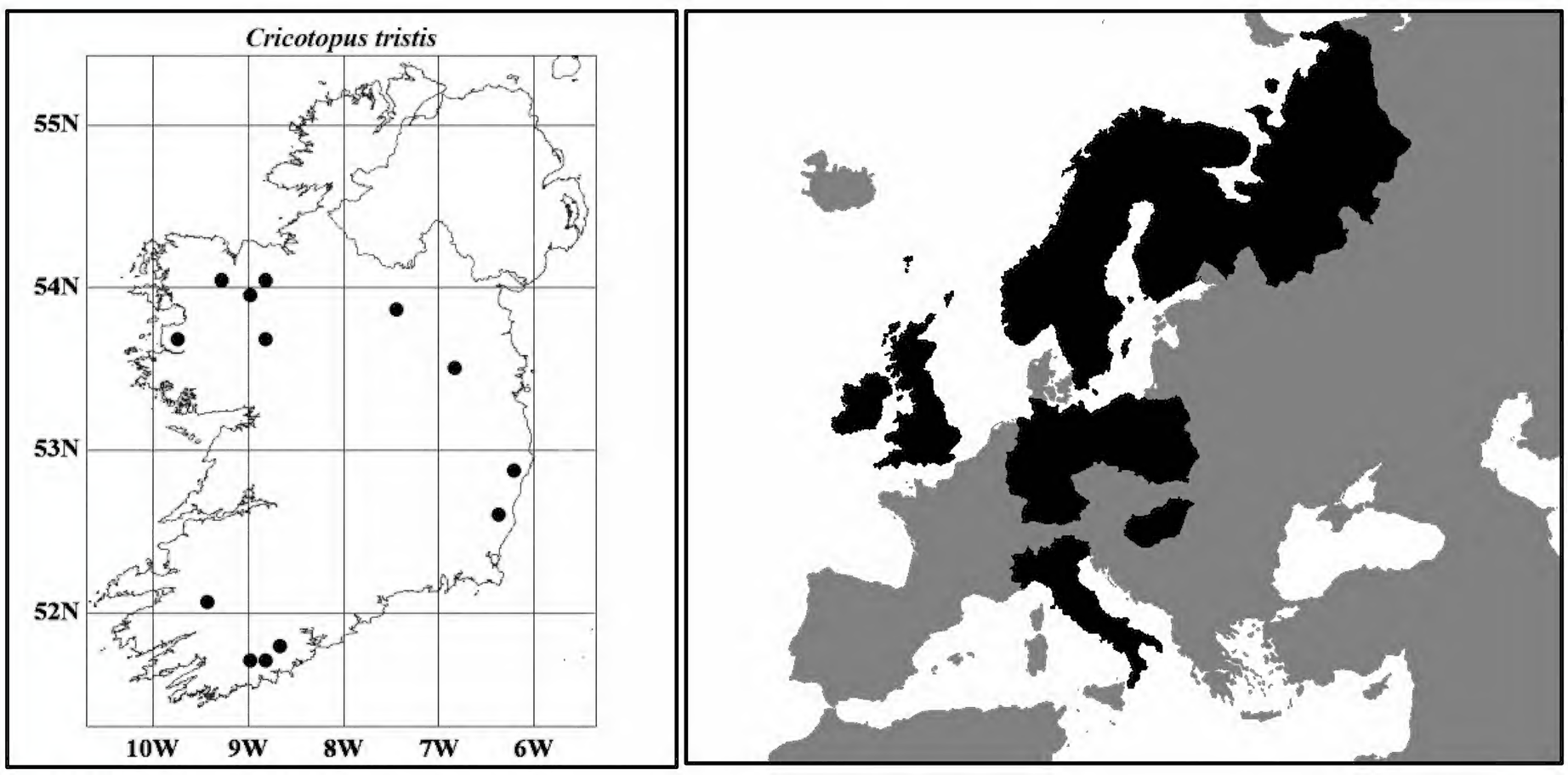
FIGURES 267-268. *Cricotopus tremulus* (Linnaeus, 1758).



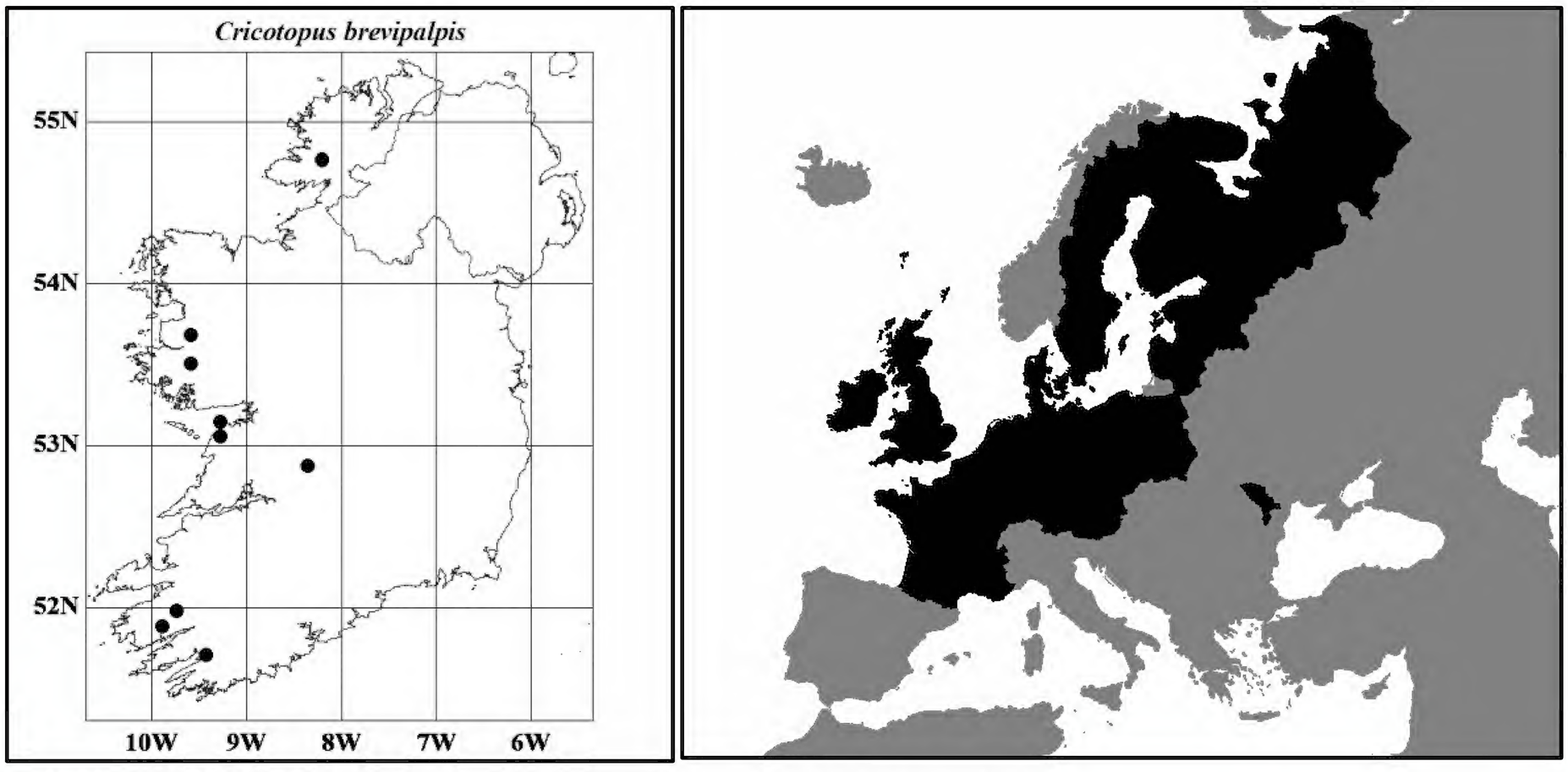
FIGURES 269-270. *Cricotopus triannulatus* (Macquart, 1826).



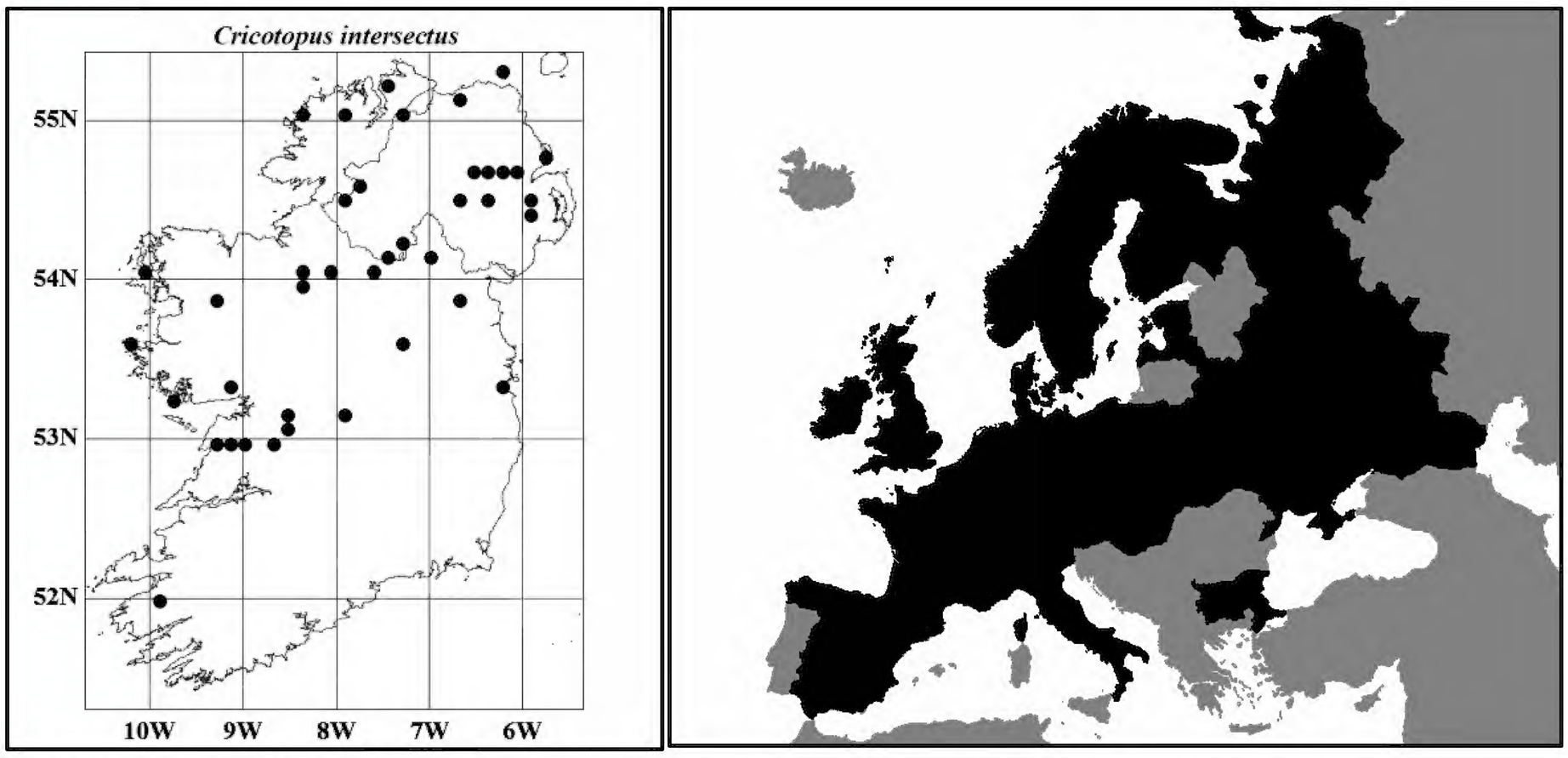
FIGURES 271-272. *Cricotopus trifascia* Edwards, 1929.



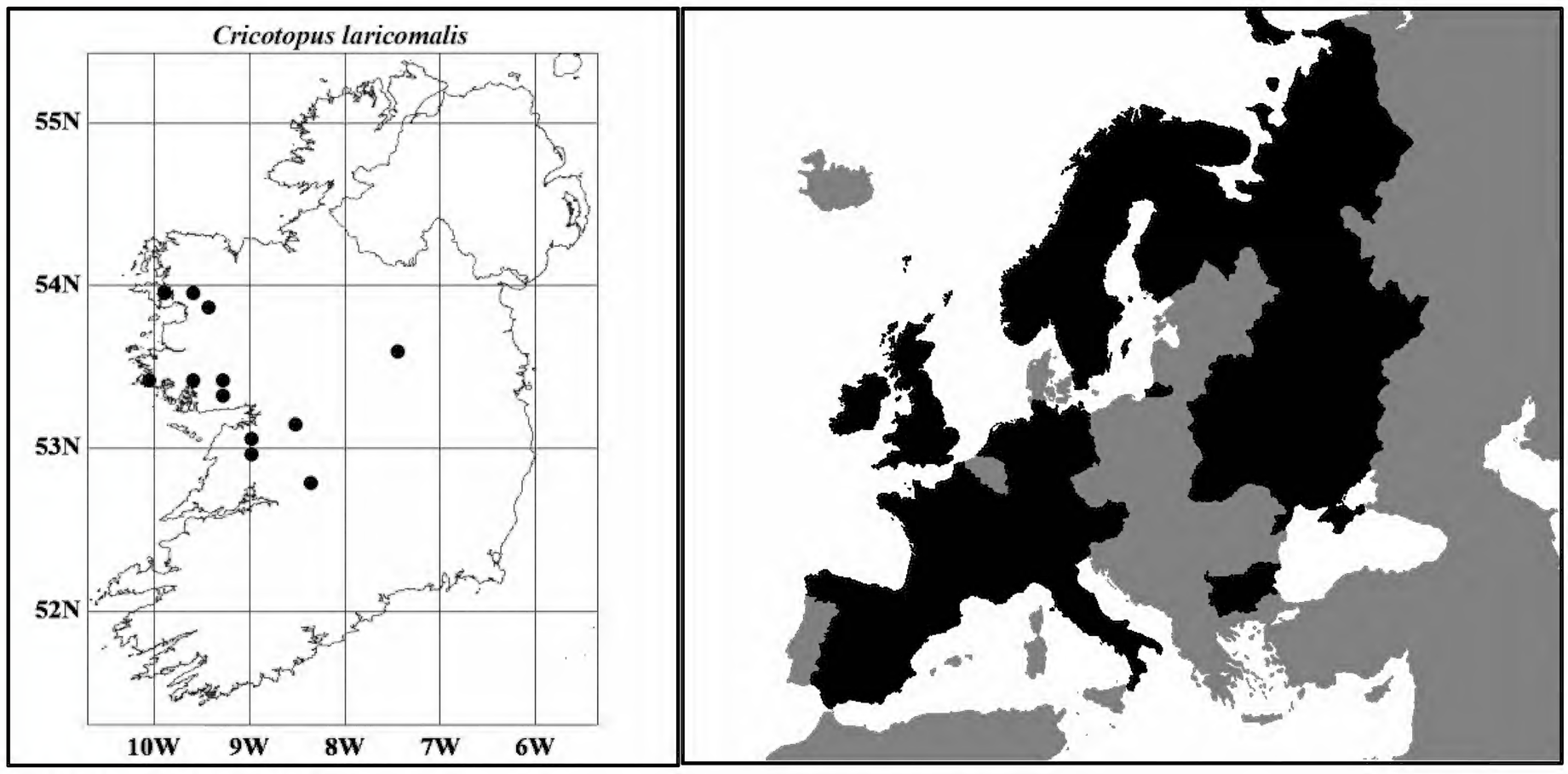
FIGURES 273-274. *Cricotopus tristis* Hirvenoja 1973.



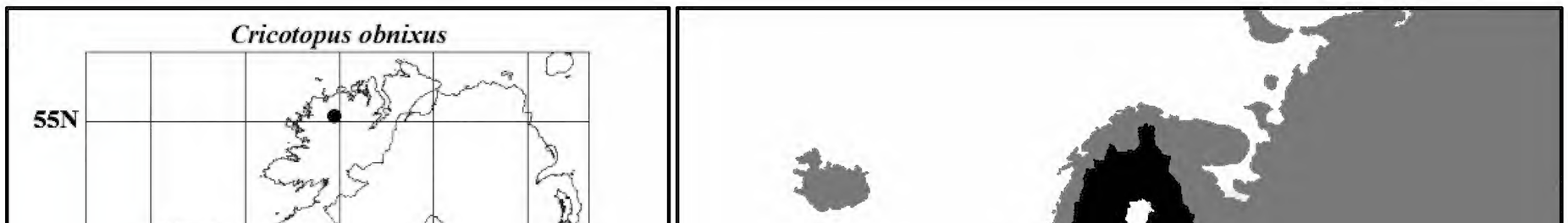
FIGURES 275-276. *Cricotopus brevipalpis* Kieffer, 1909.



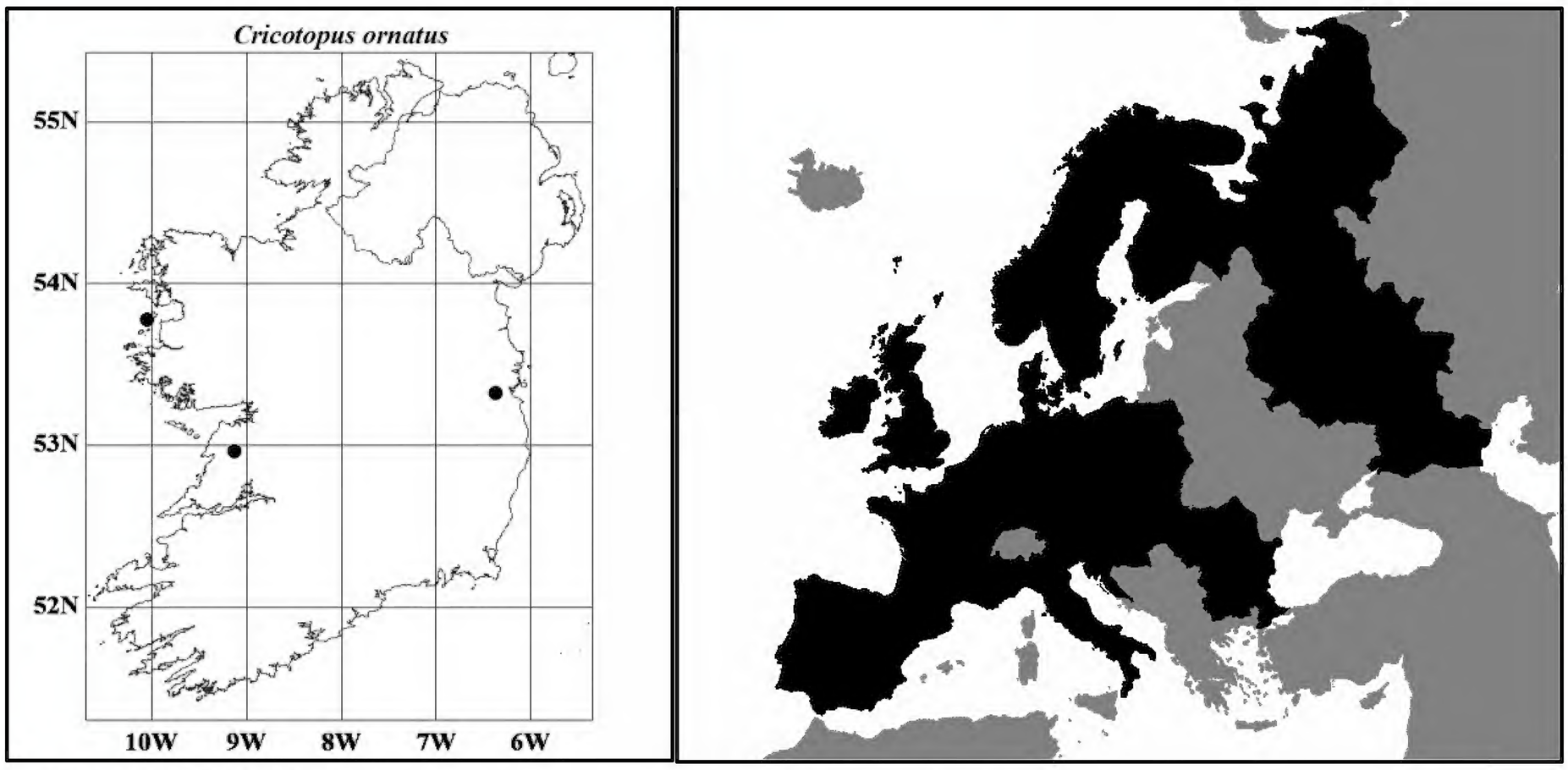
FIGURES 277-278. *Cricotopus intersectus* (Staeger, 1839).



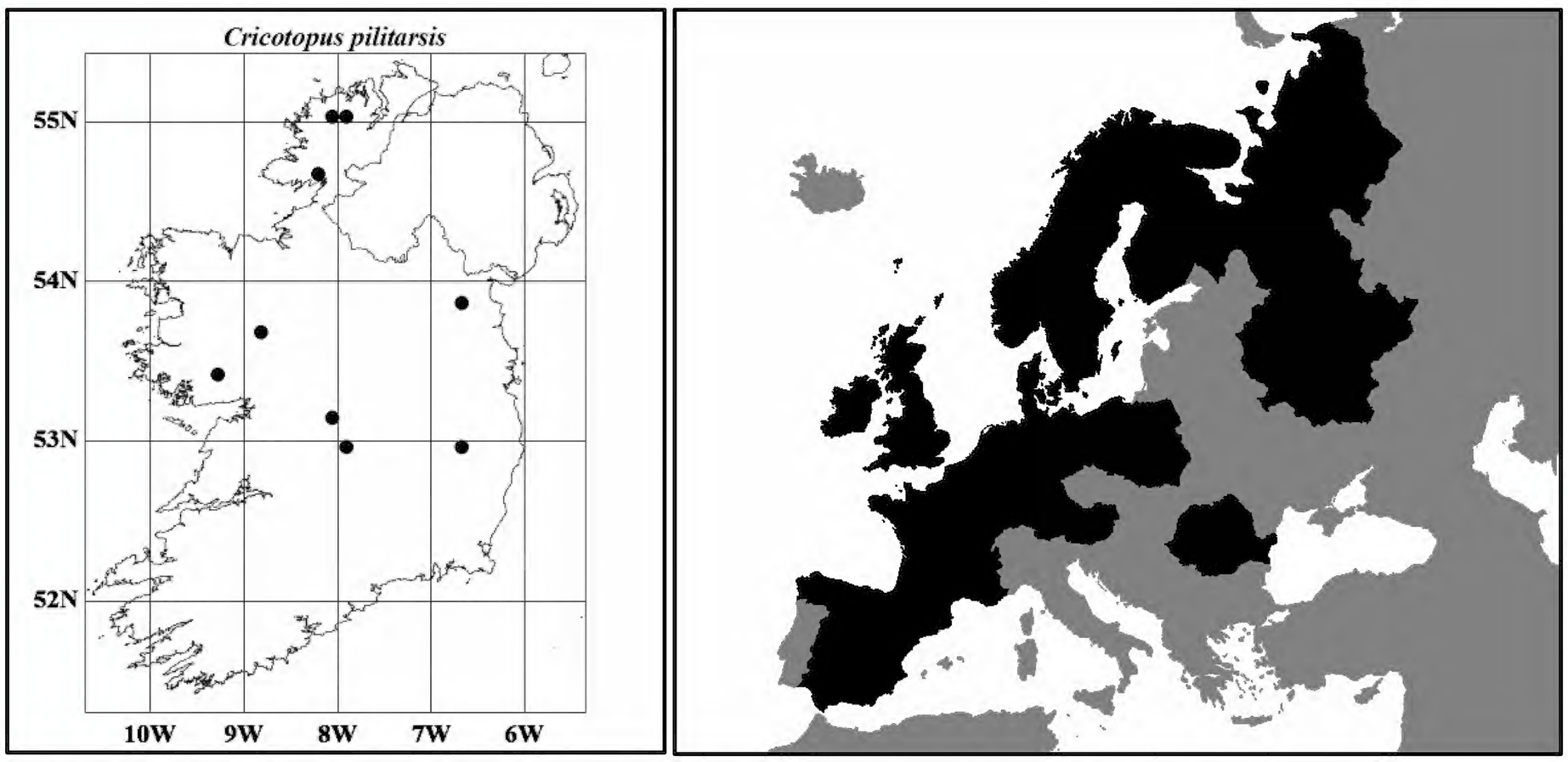
FIGURES 279-280. *Cricotopus laricomalis* Edwards, 1932.



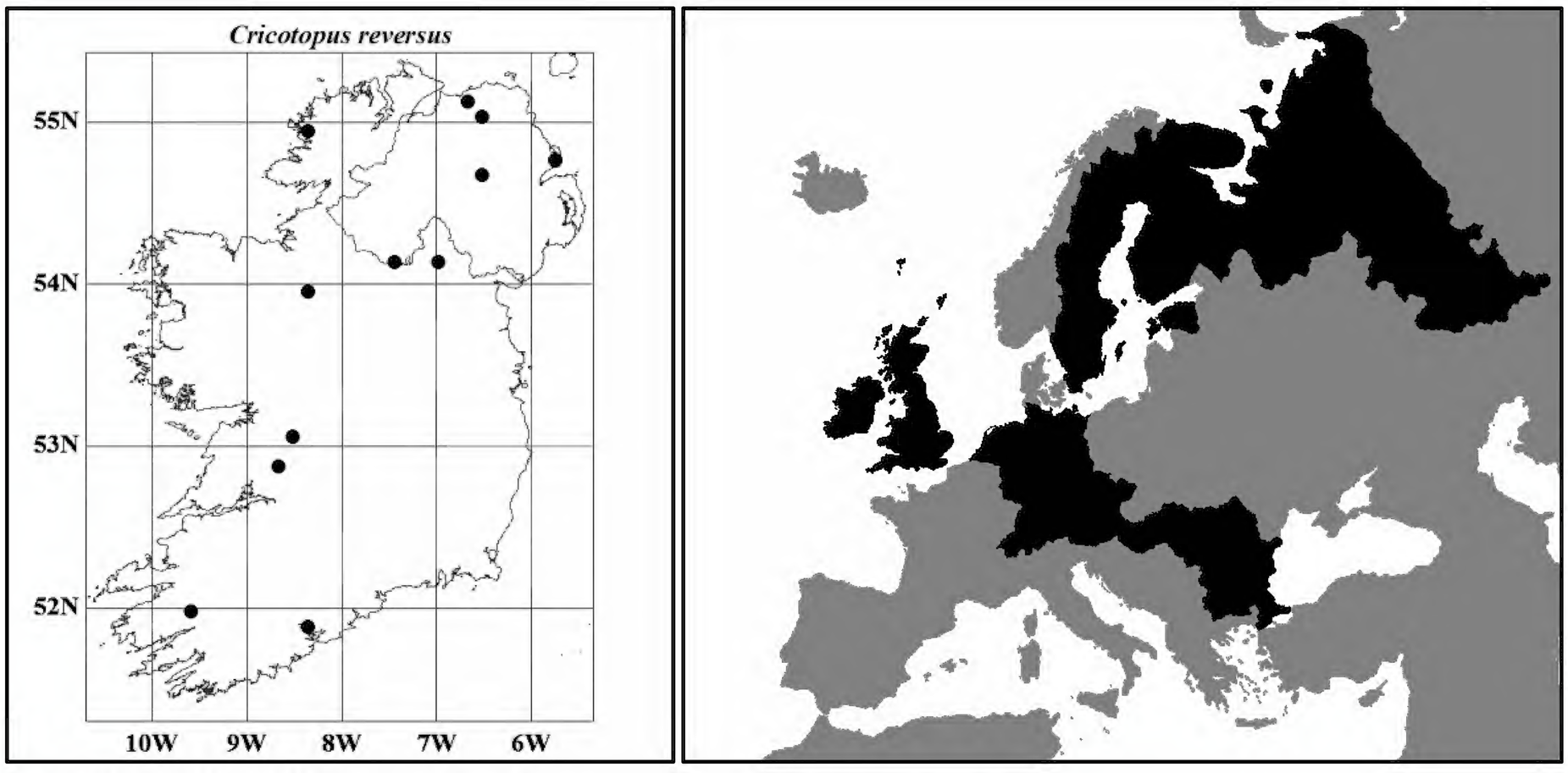
FIGURES 281-282. *Cricotopus obnixus* (Walker, 1856).



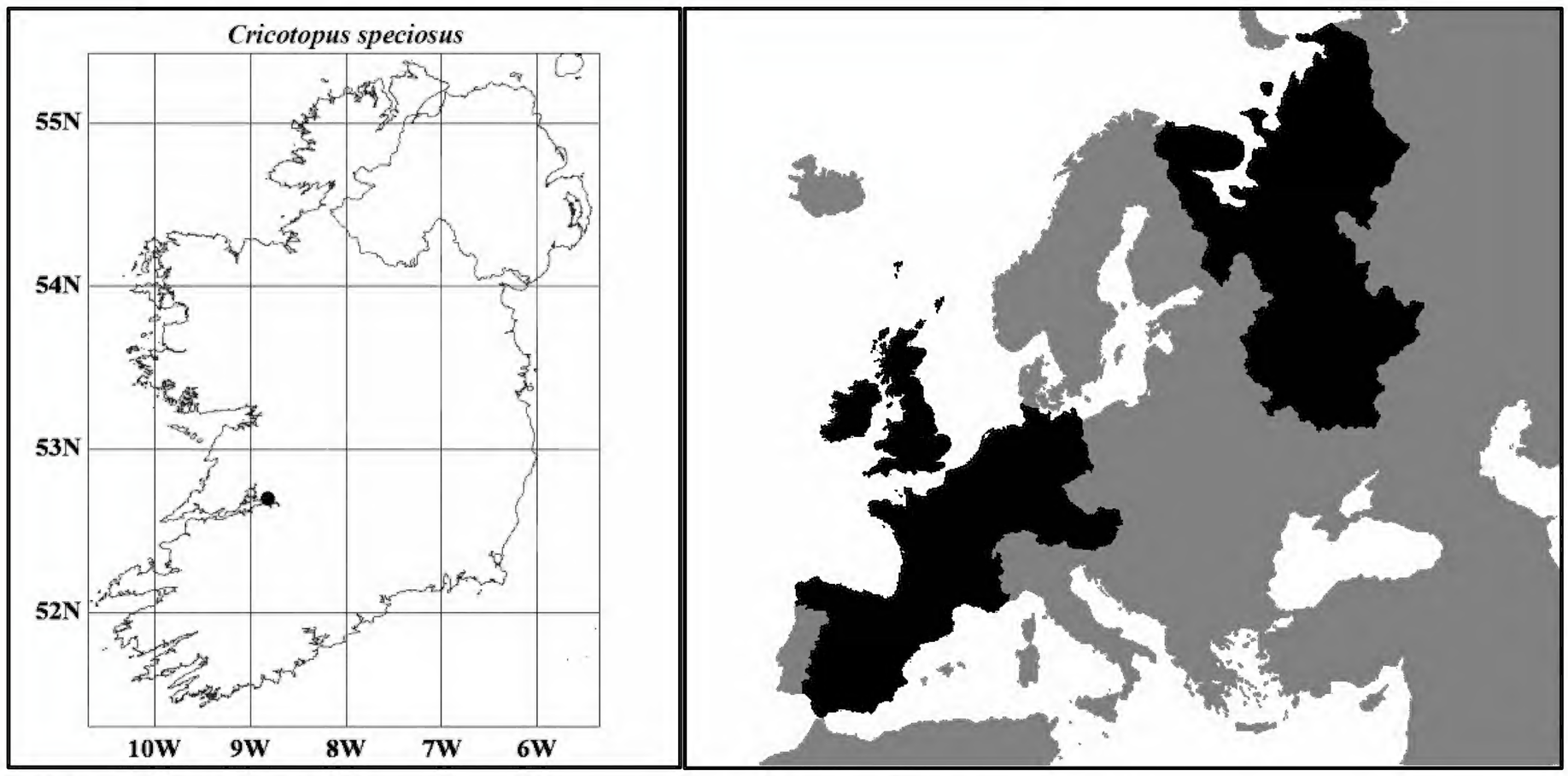
FIGURES 283-284. *Cricotopus ornatus* (Meigen, 1818).



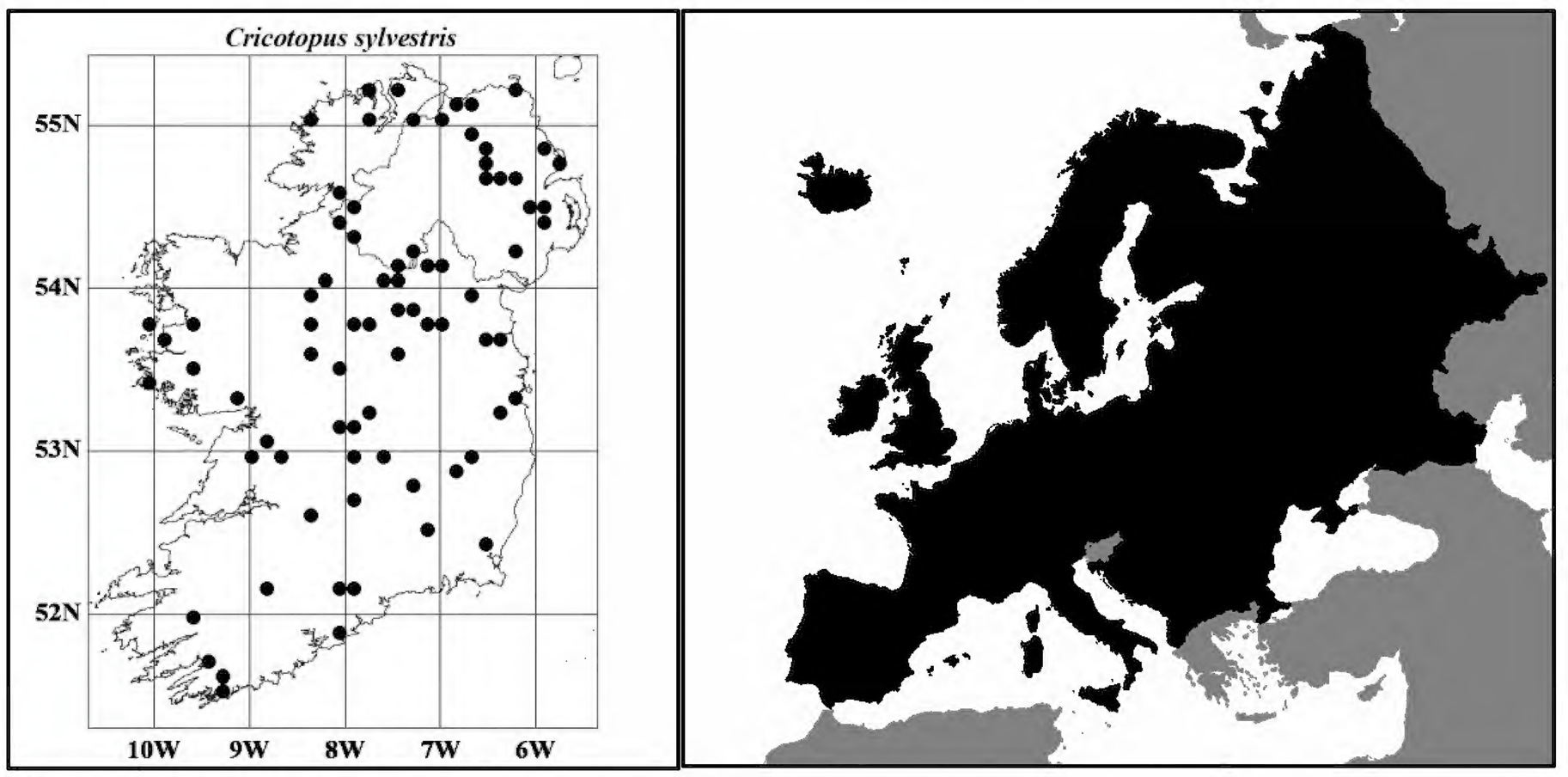
FIGURES 285-286. *Cricotopus pilitarsis* (Zetterstedt, 1850).



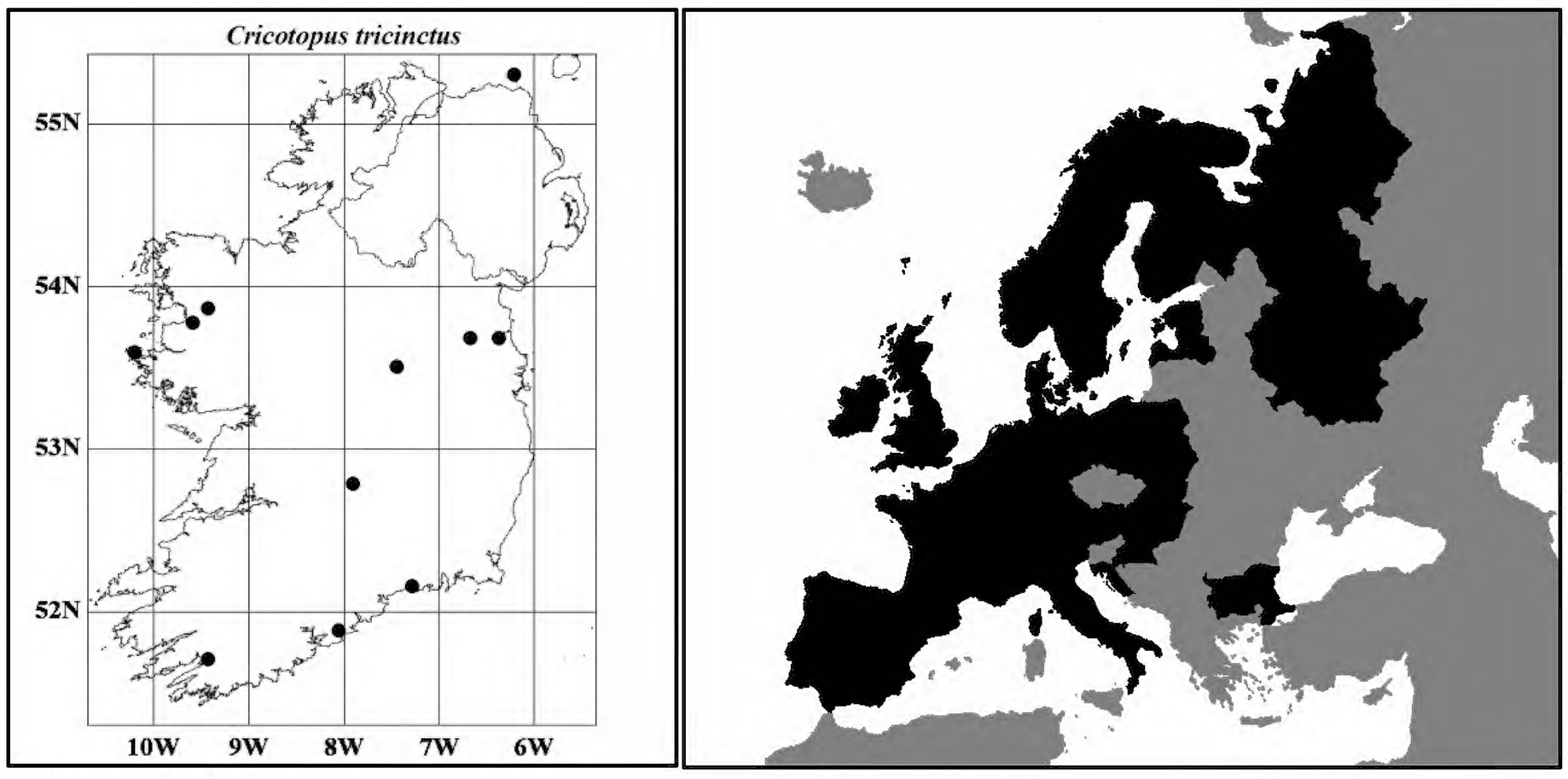
FIGURES 287-288. *Cricotopus reversus* Hirvenoja, 1973.



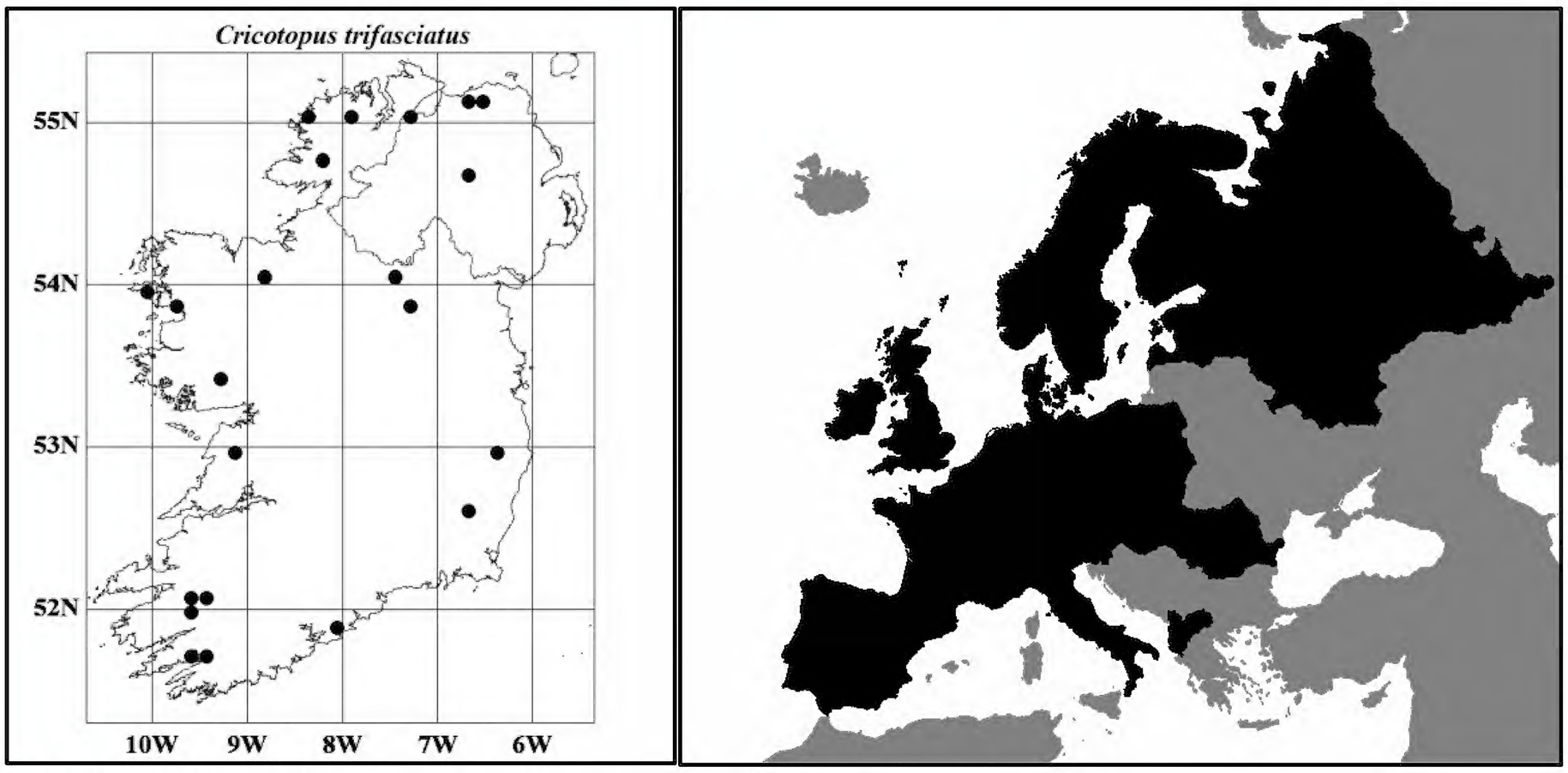
FIGURES 289-290. *Cricotopus speciosus* Goetghebuer, 1921.



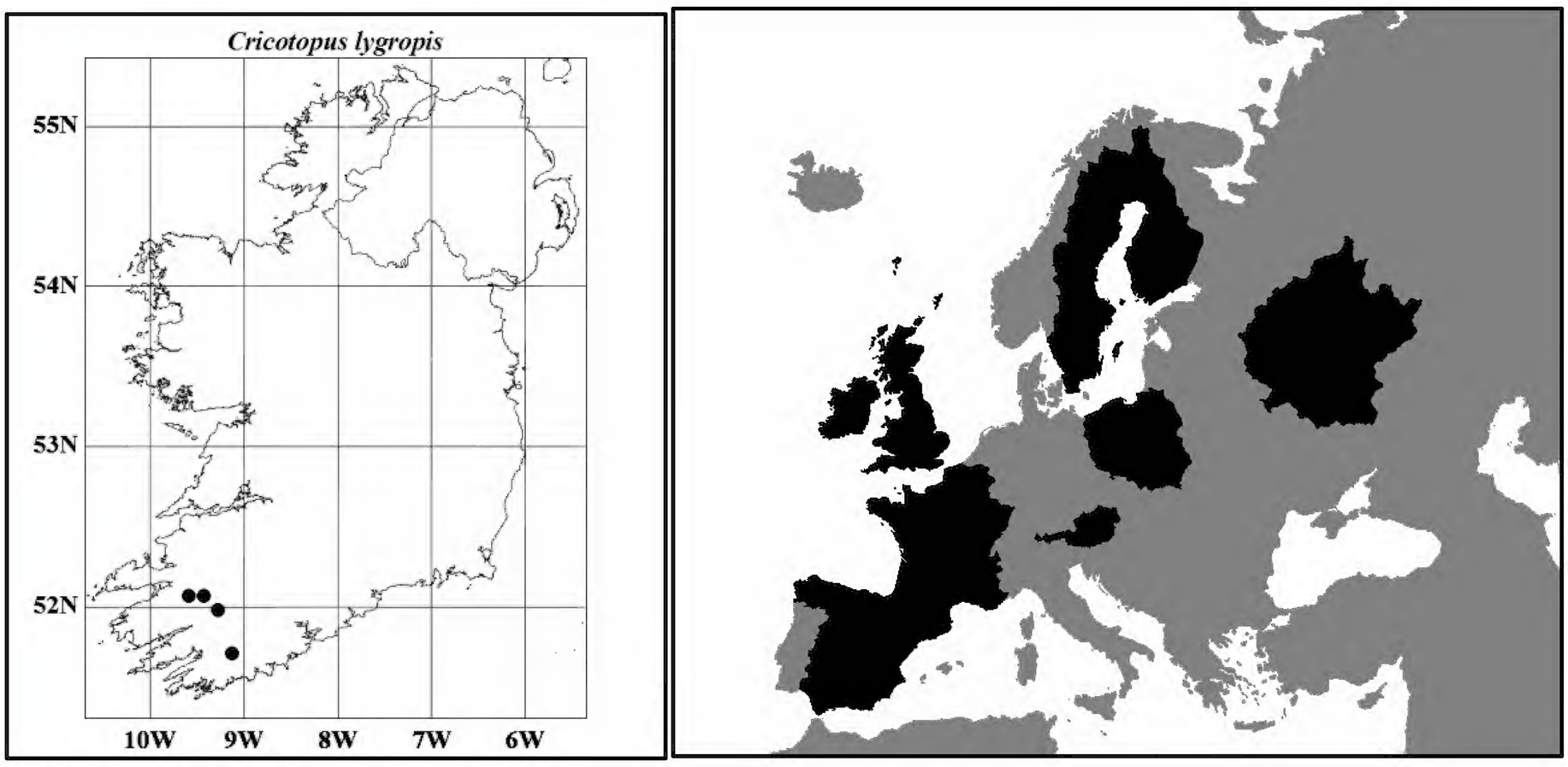
FIGURES 291-292. *Cricotopus sylvestris* (Fabricius, 1794).



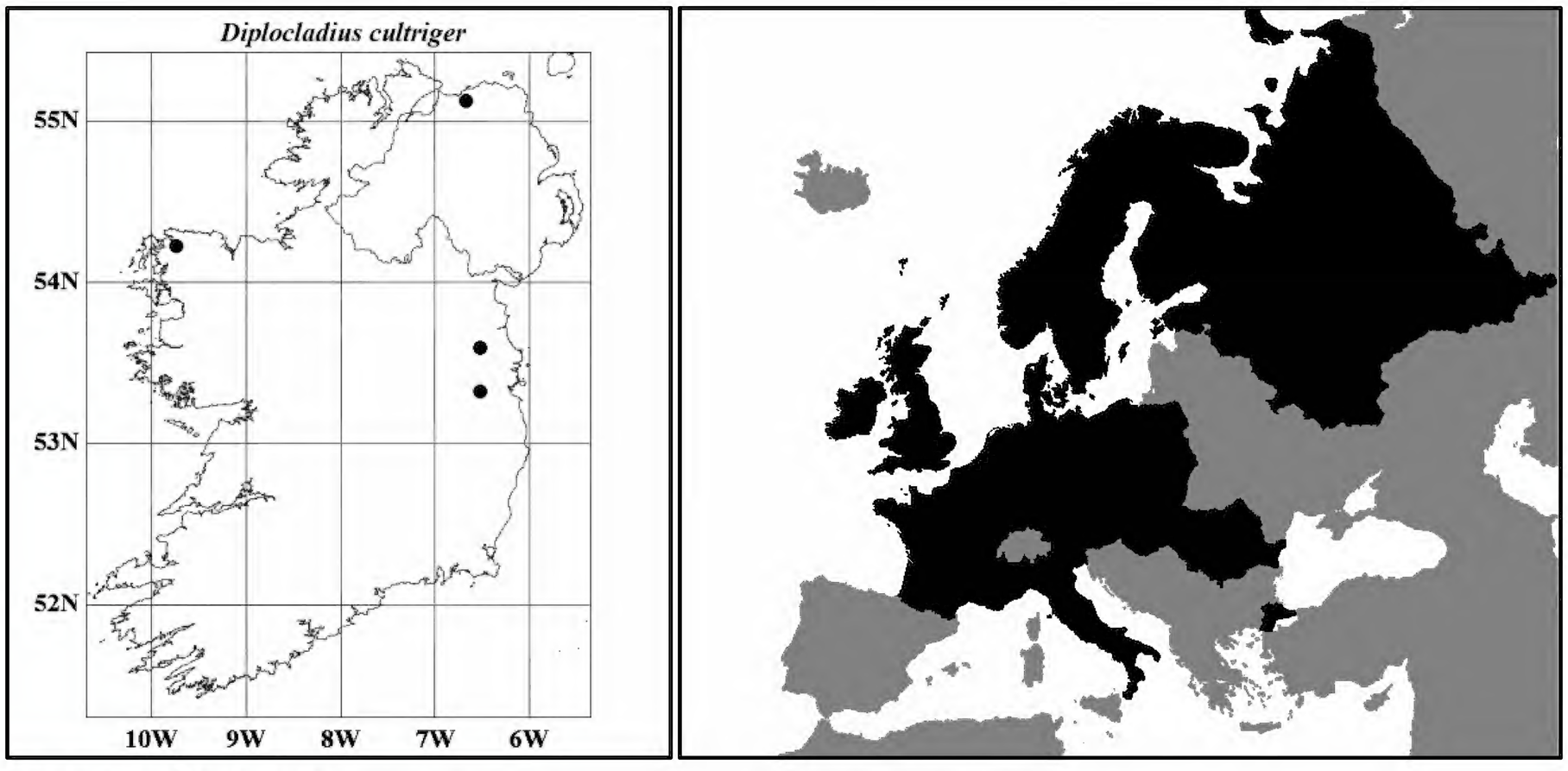
FIGURES 293-294. *Cricotopus tricinctus* (Meigen, 1818).



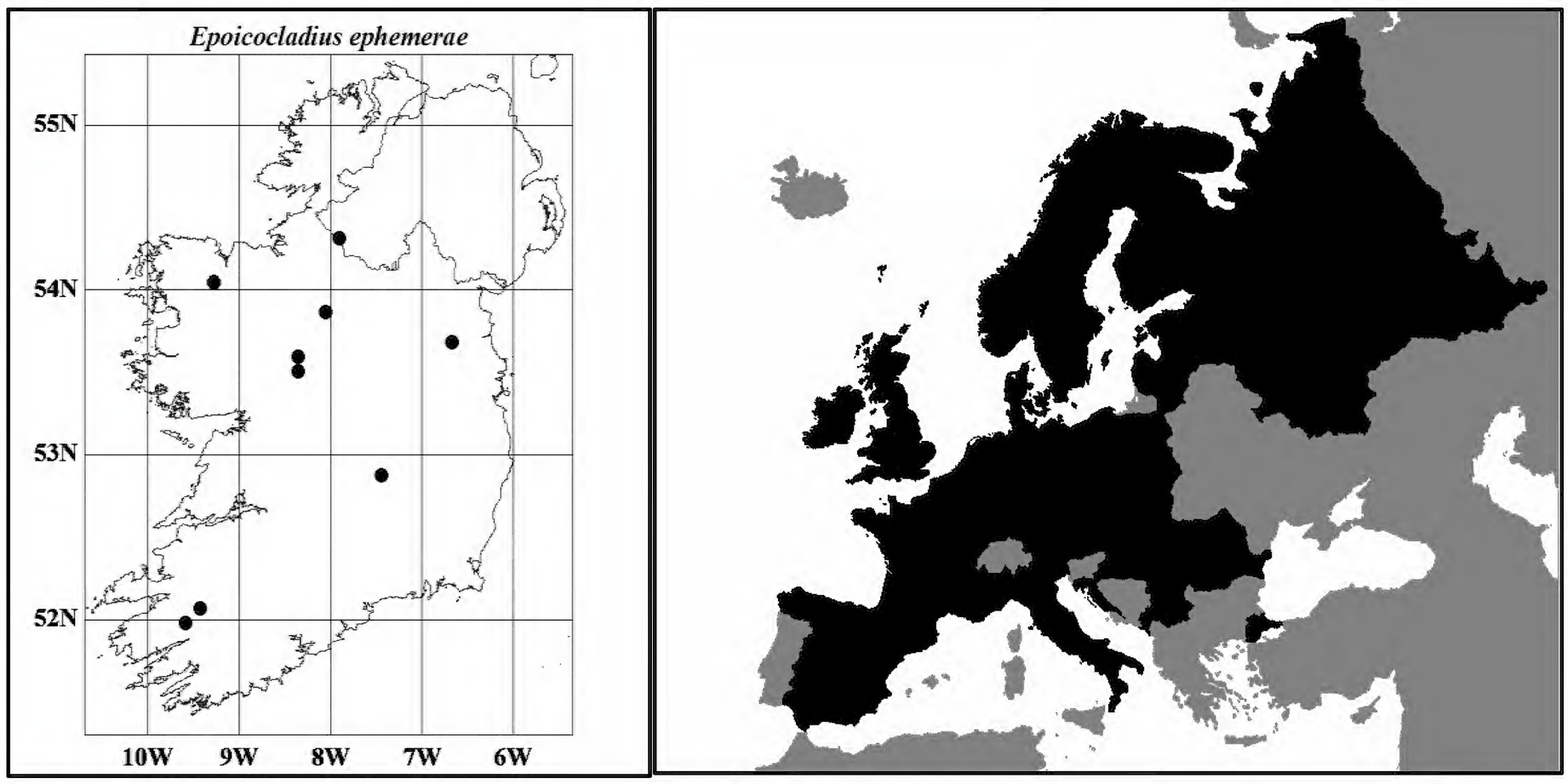
FIGURES 295-296. *Cricotopus trifasciatus* (Meigen, 1810).



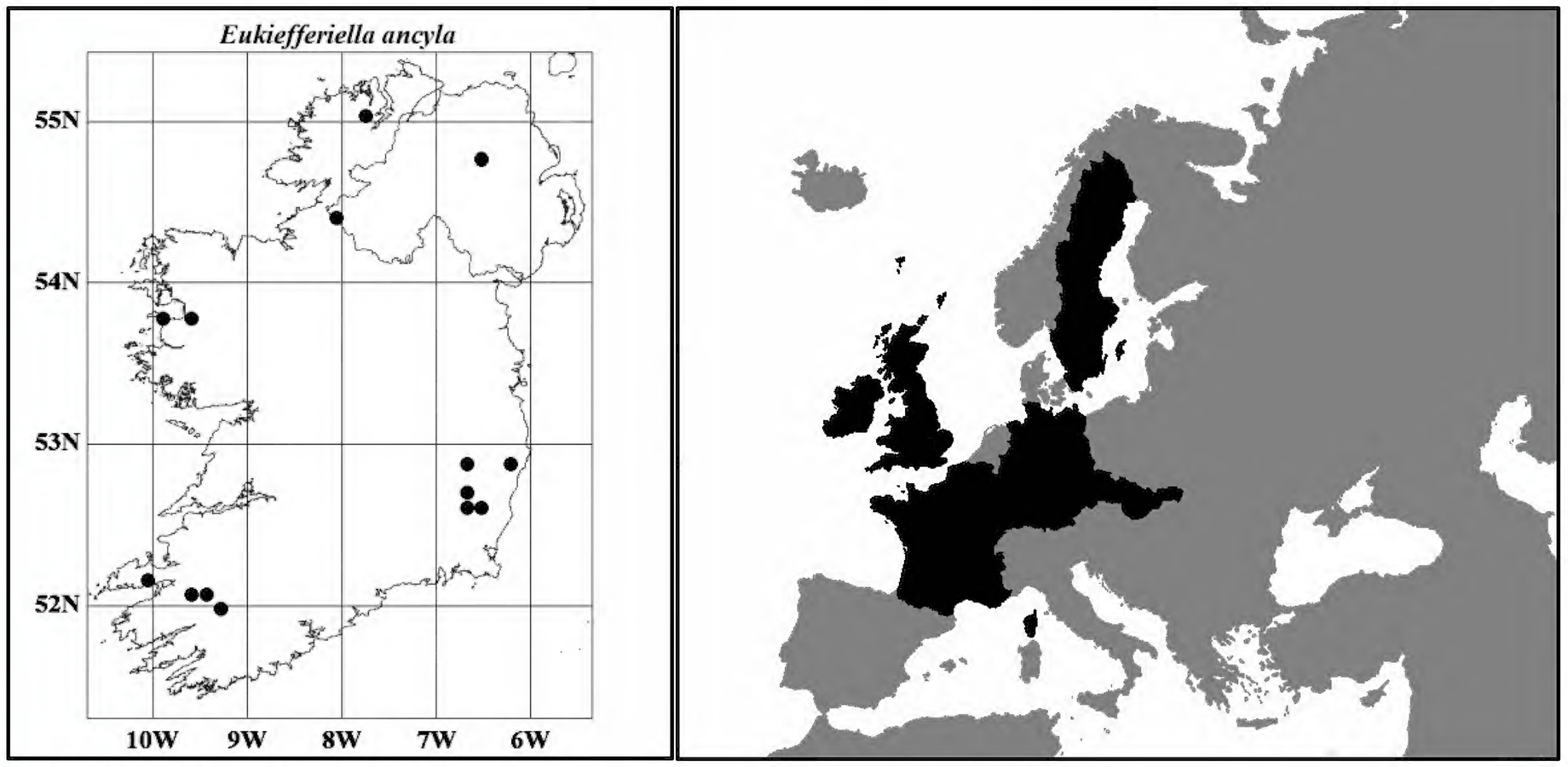
FIGURES 297-298. *Cricotopus lygropis* Edwards, 1929.



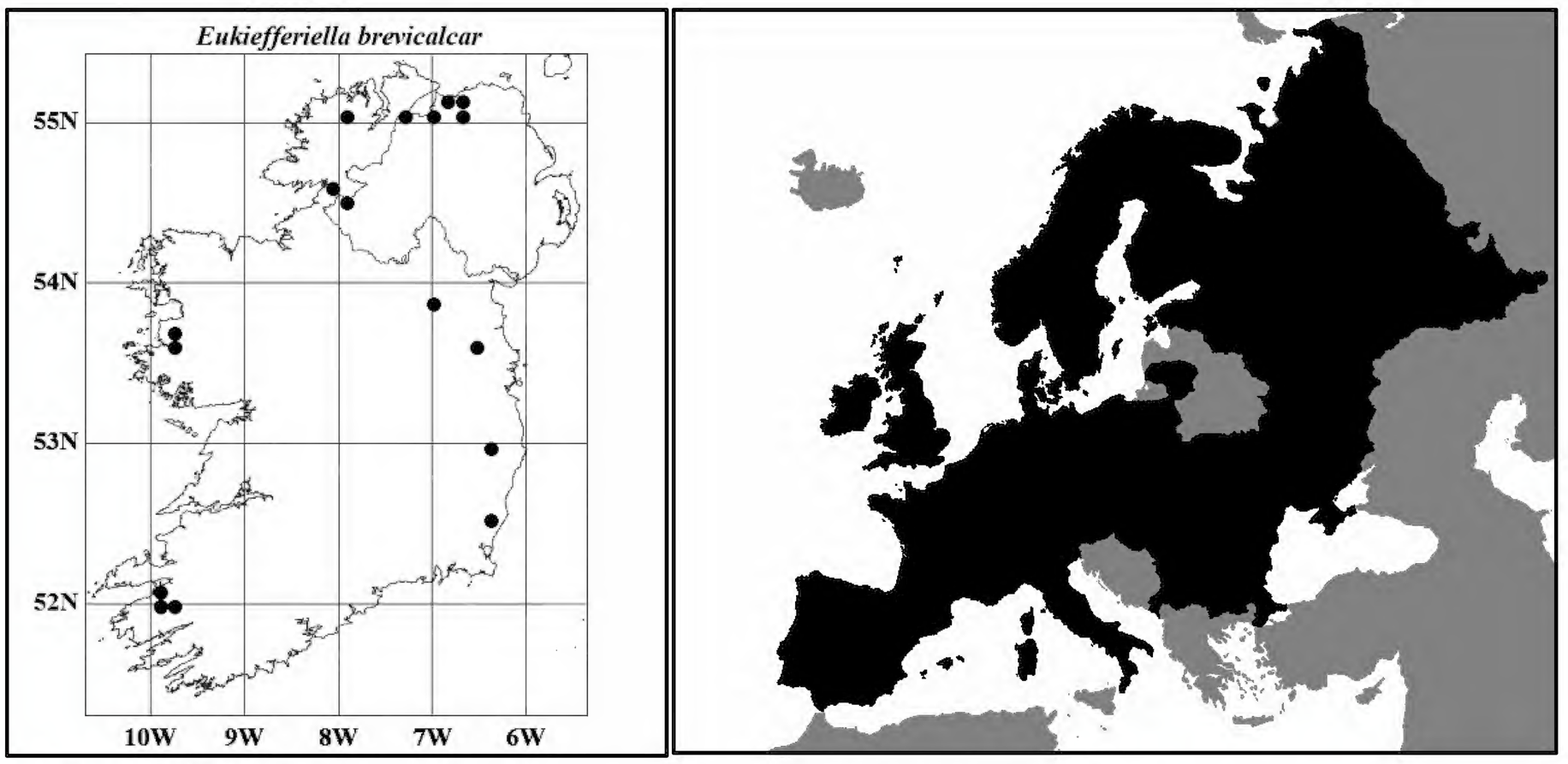
FIGURES 299-300. *Diplocladius cultriger* Kieffer, 1908.



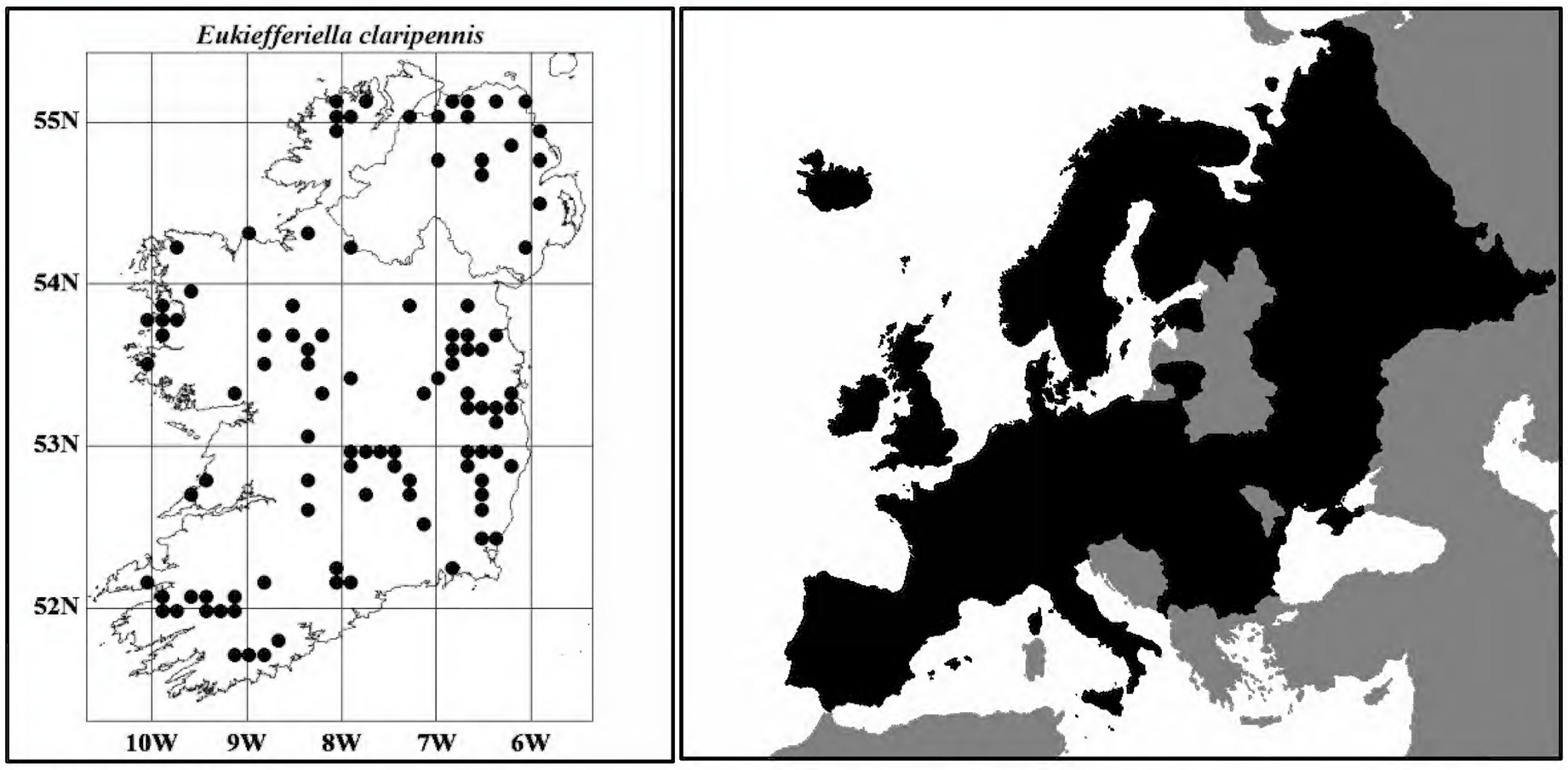
FIGURES 301-302. *Epoicocladius ephemerae* (Kieffer, 1924).



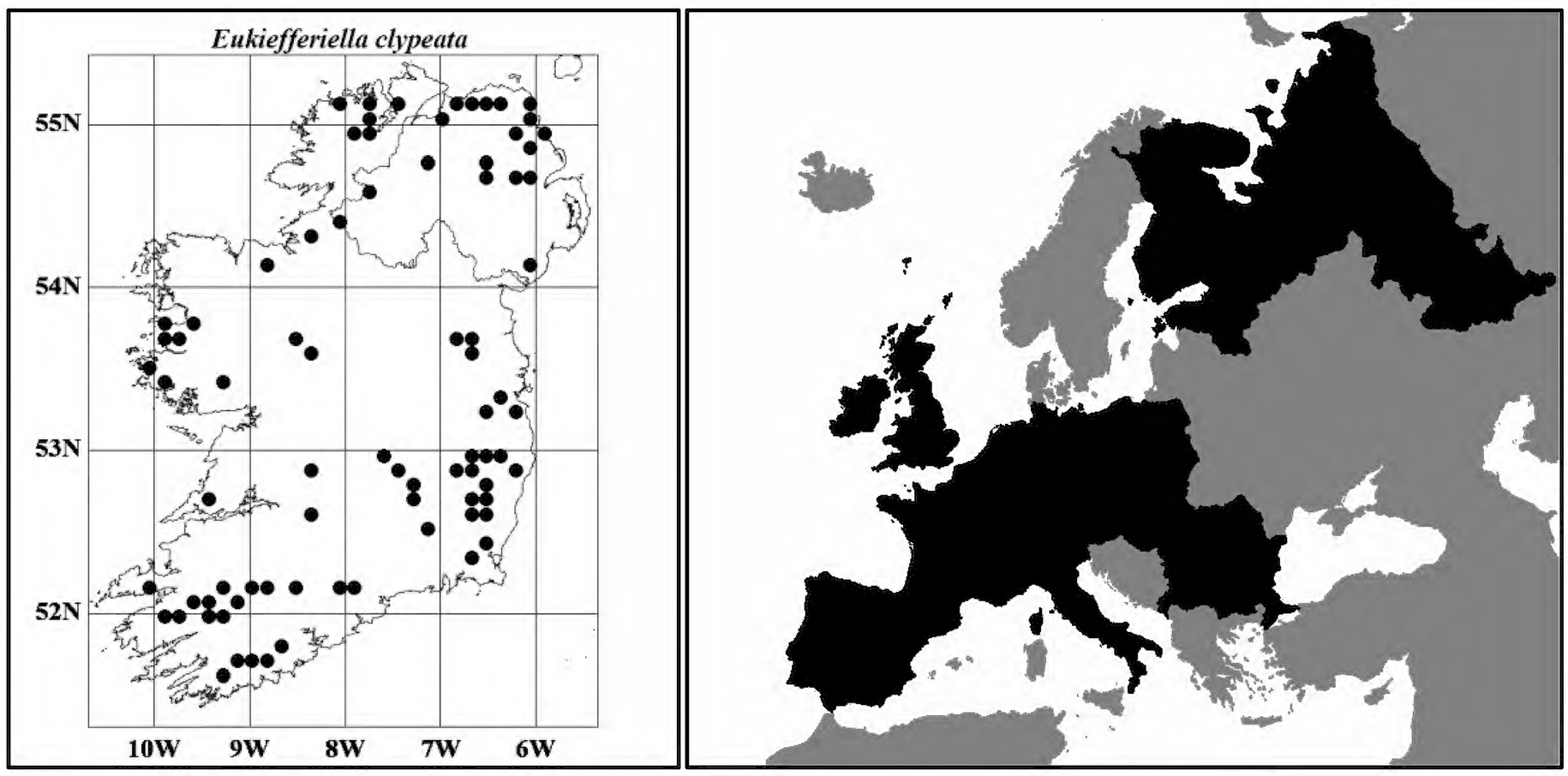
FIGURES 303-304. *Eukiefferiella ancyla* Svensson, 1986.



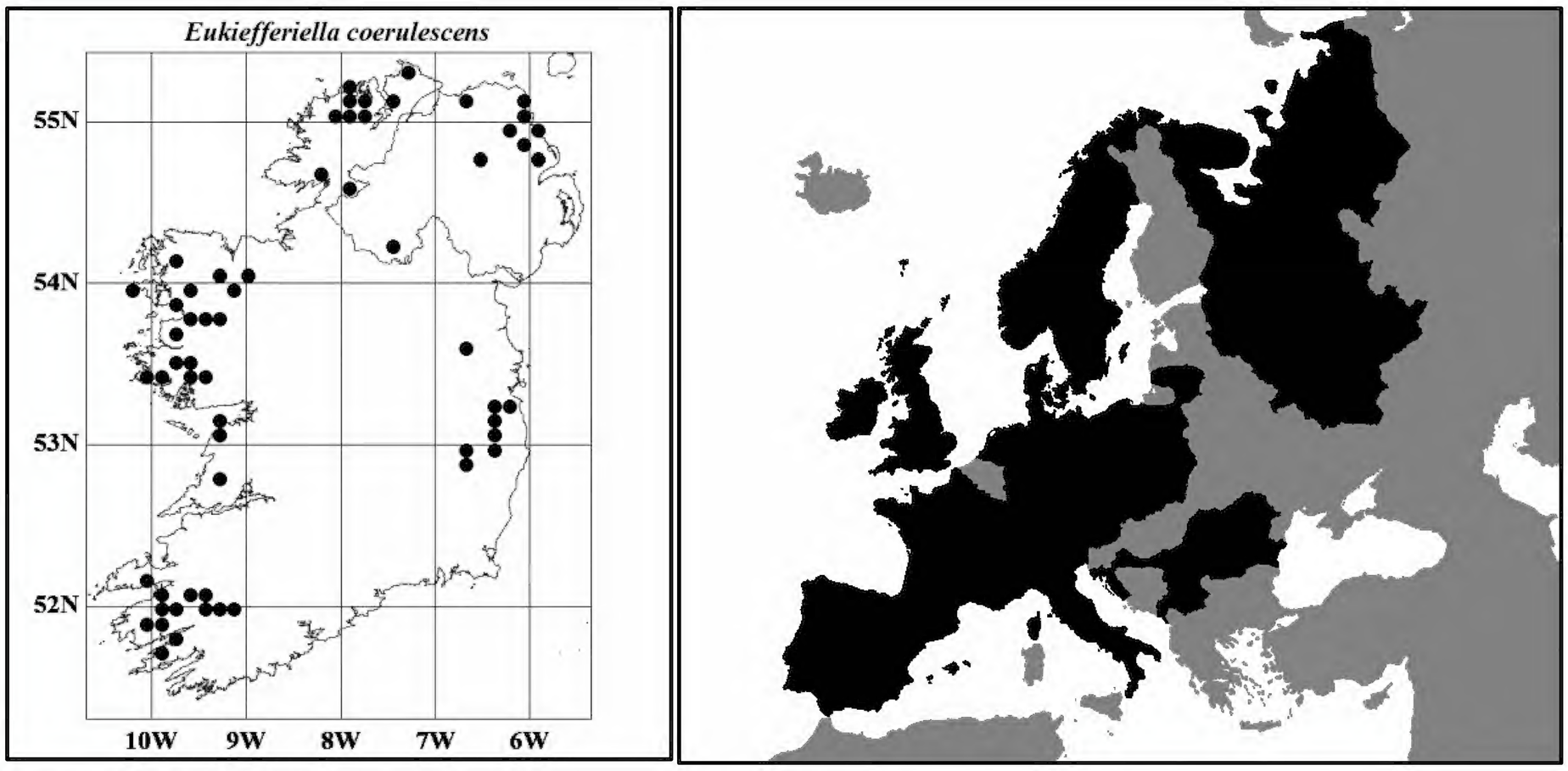
FIGURES 305-306. *Eukiefferiella brevicalcar* (Kieffer, 1911).



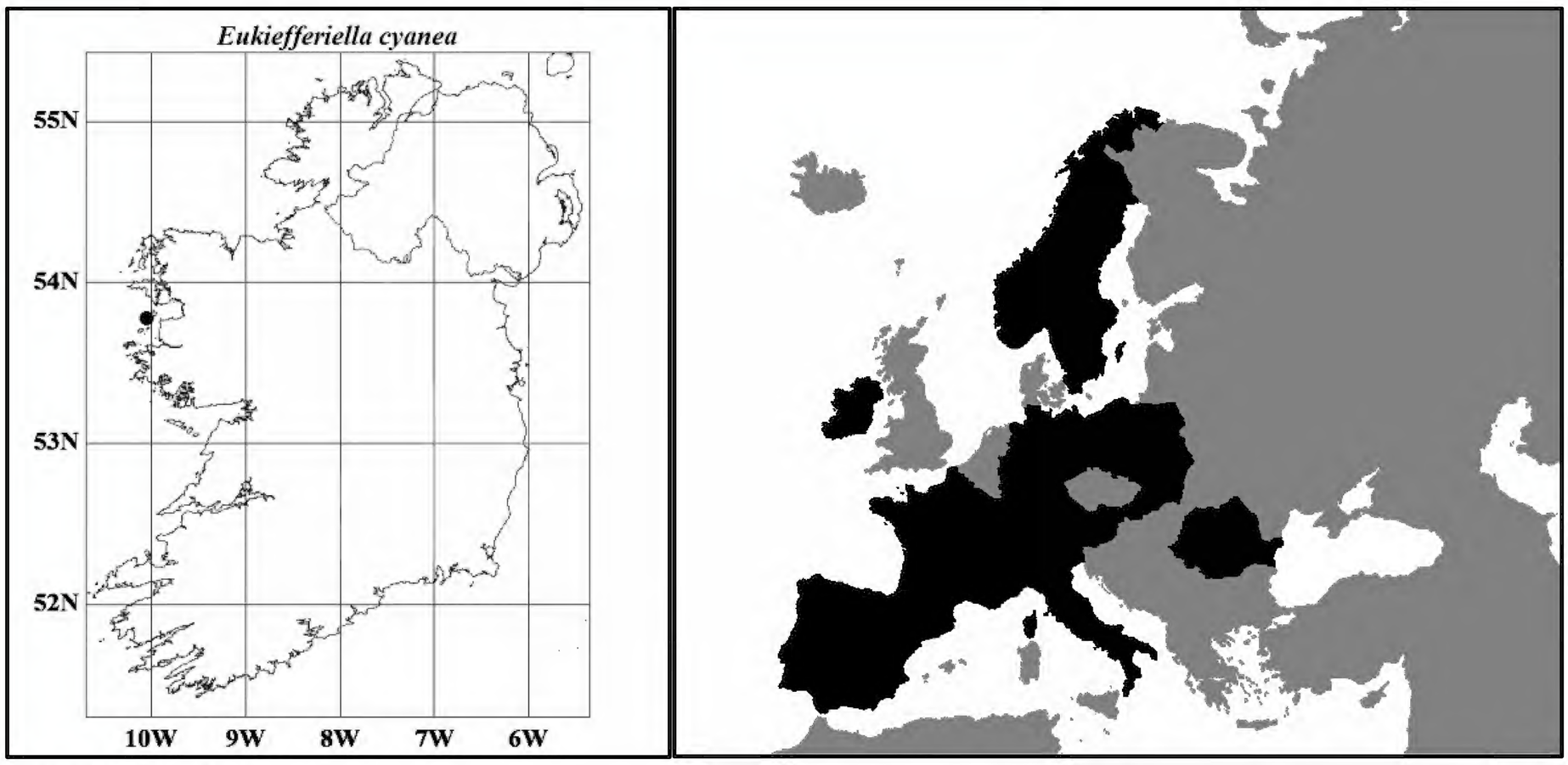
FIGURES 307-308. *Eukiefferiella claripennis* (Lundbeck, 1898).



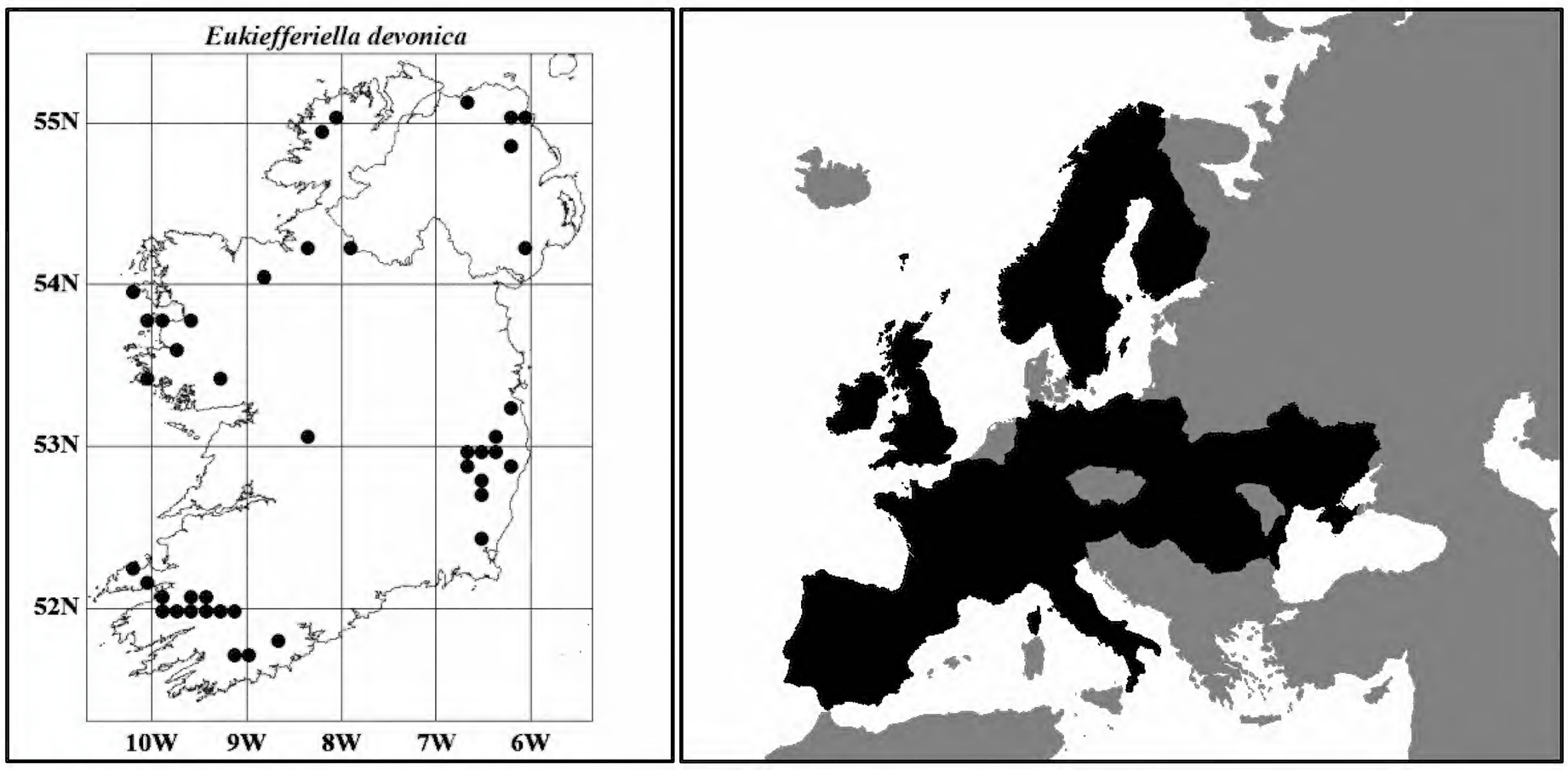
FIGURES 309-310. *Eukiefferiella clypeata* (Thienemann, 1919).



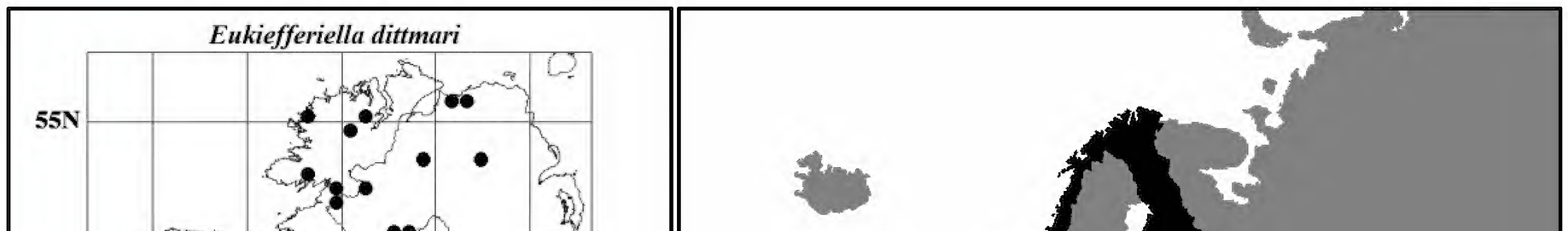
FIGURES 311-312. *Eukiefferiella coerulescens* (Kieffer, 1926).



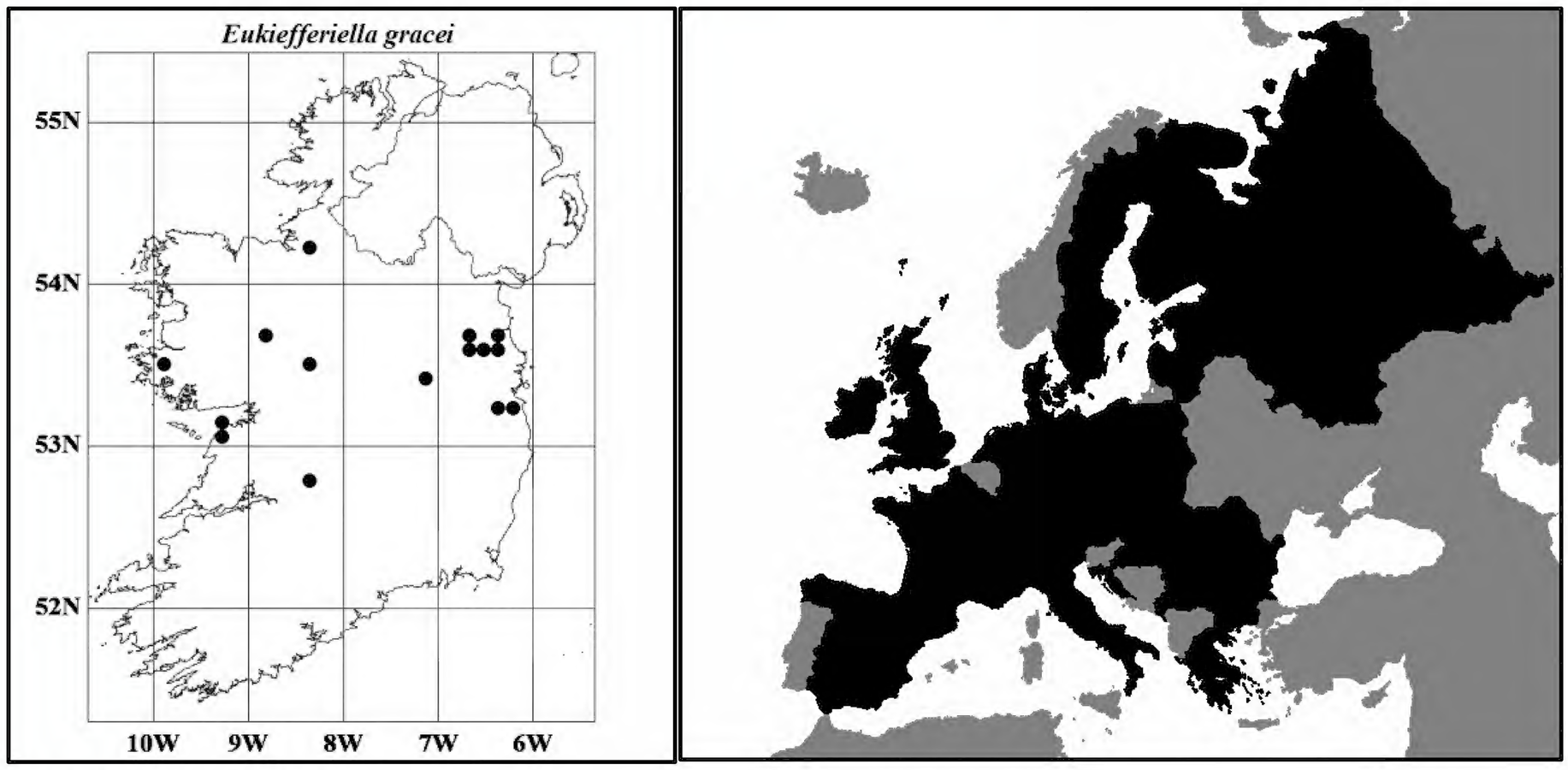
FIGURES 313-314. *Eukiefferiella cyanea* Thienemann, 1936.



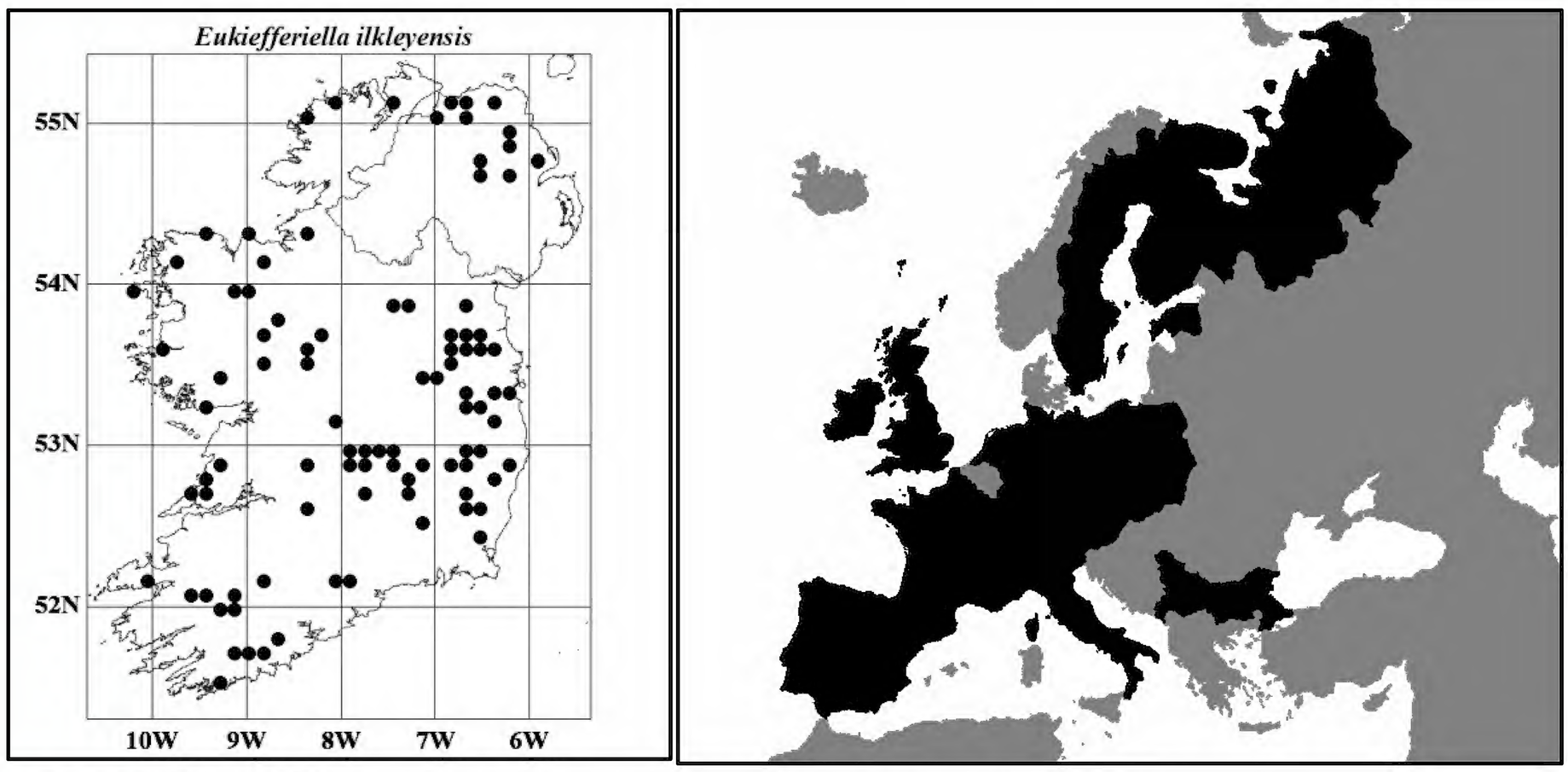
FIGURES 315-316. *Eukiefferiella devonica* (Edwards, 1929).



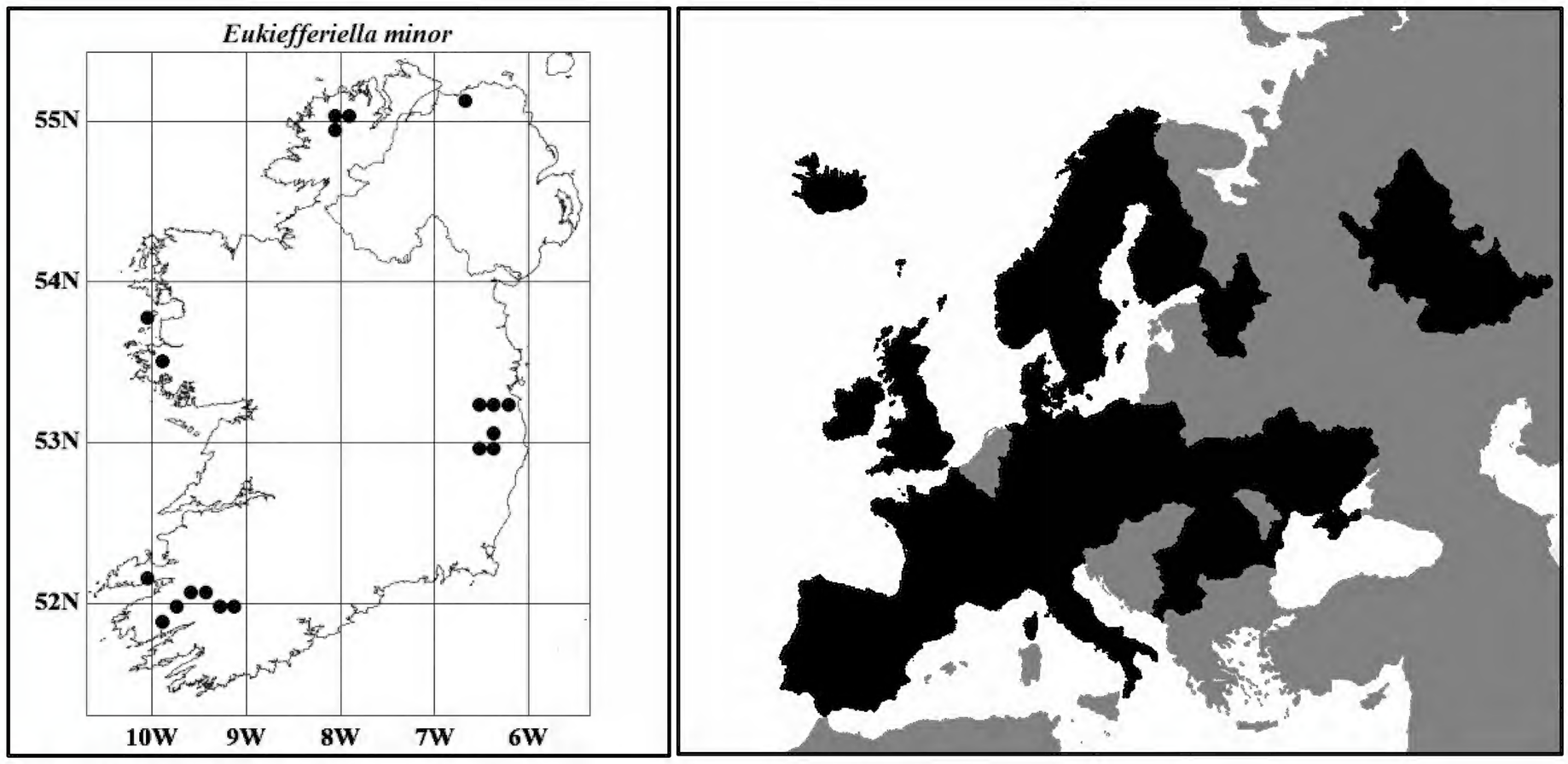
FIGURES 317-318. *Eukiefferiella dittmari* Lehmann, 1972.



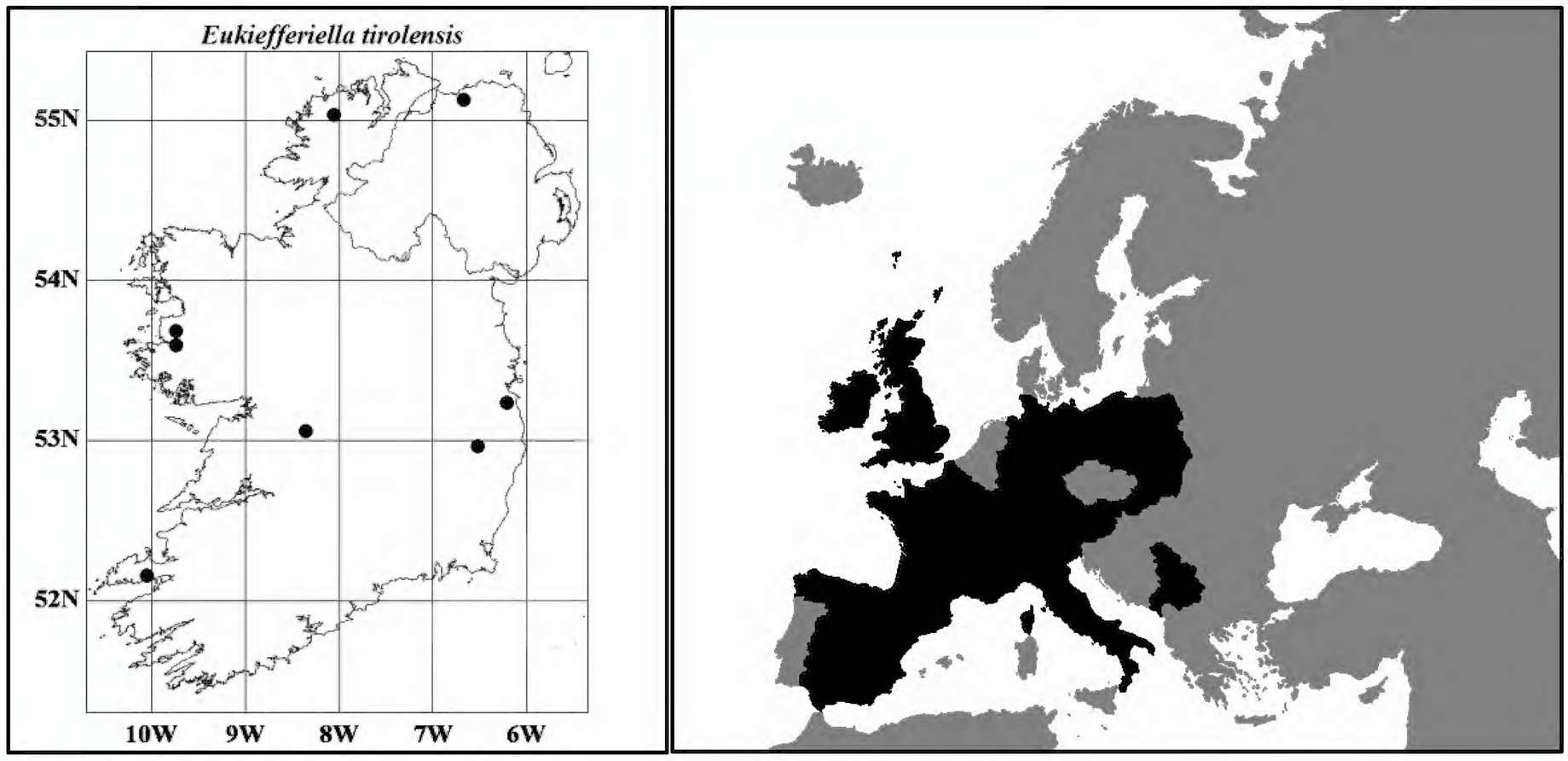
FIGURES 319-320. *Eukiefferiella gracei* (Edwards, 1929).



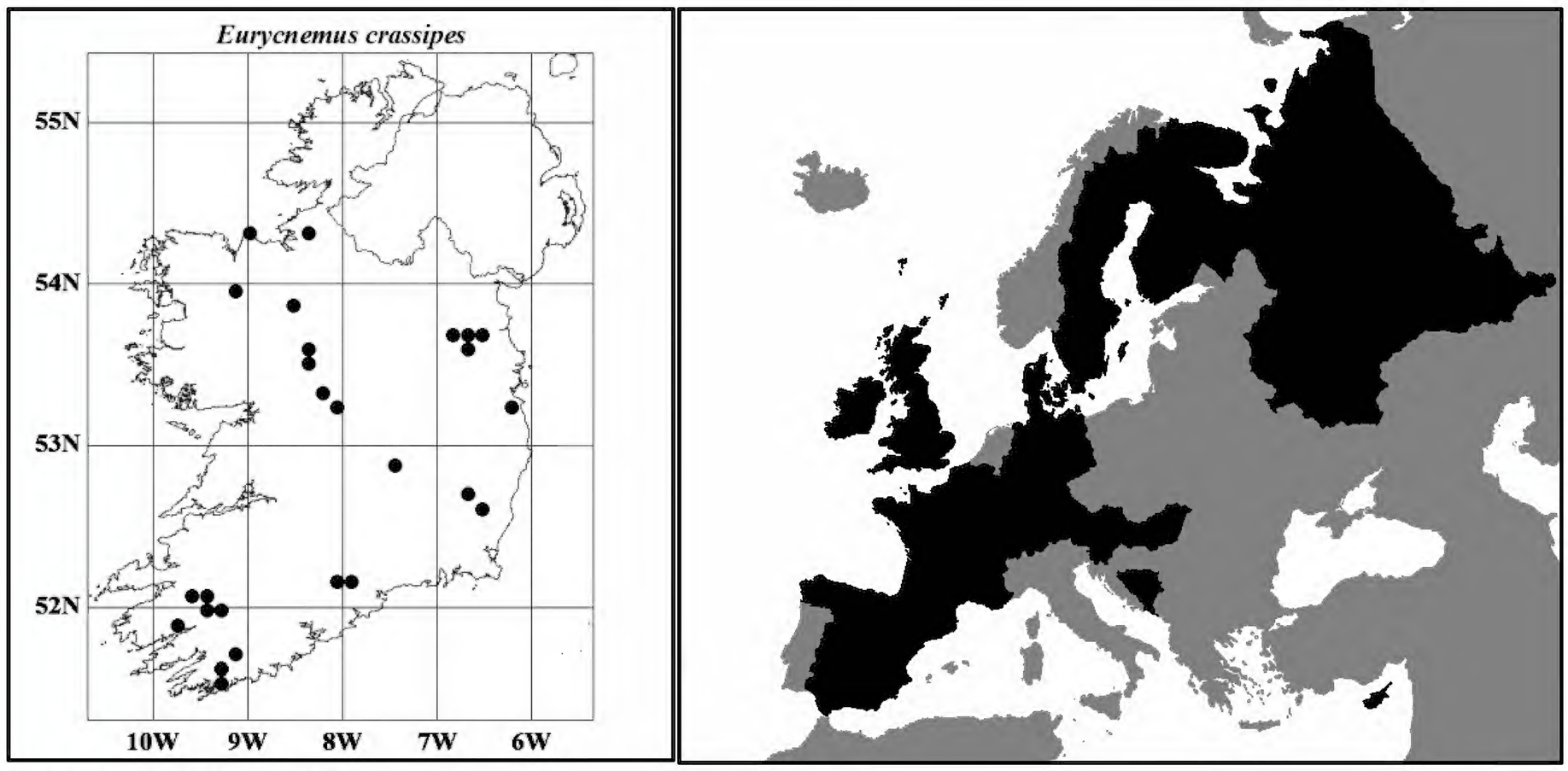
FIGURES 321-322. *Eukiefferiella ilkleyensis* (Edwards, 1929).



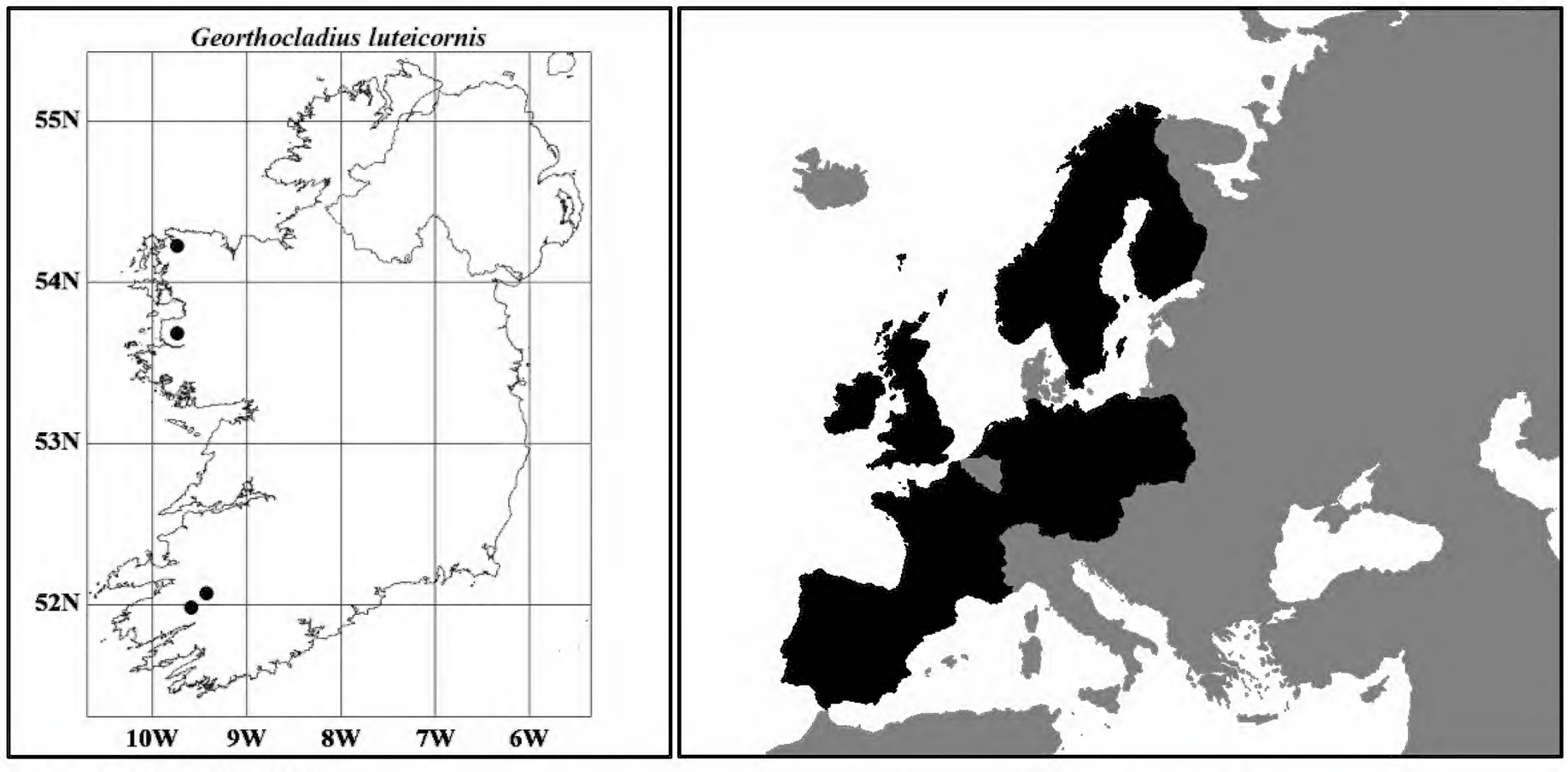
FIGURES 323-324. *Eukiefferiella minor* (Edwards, 1929).



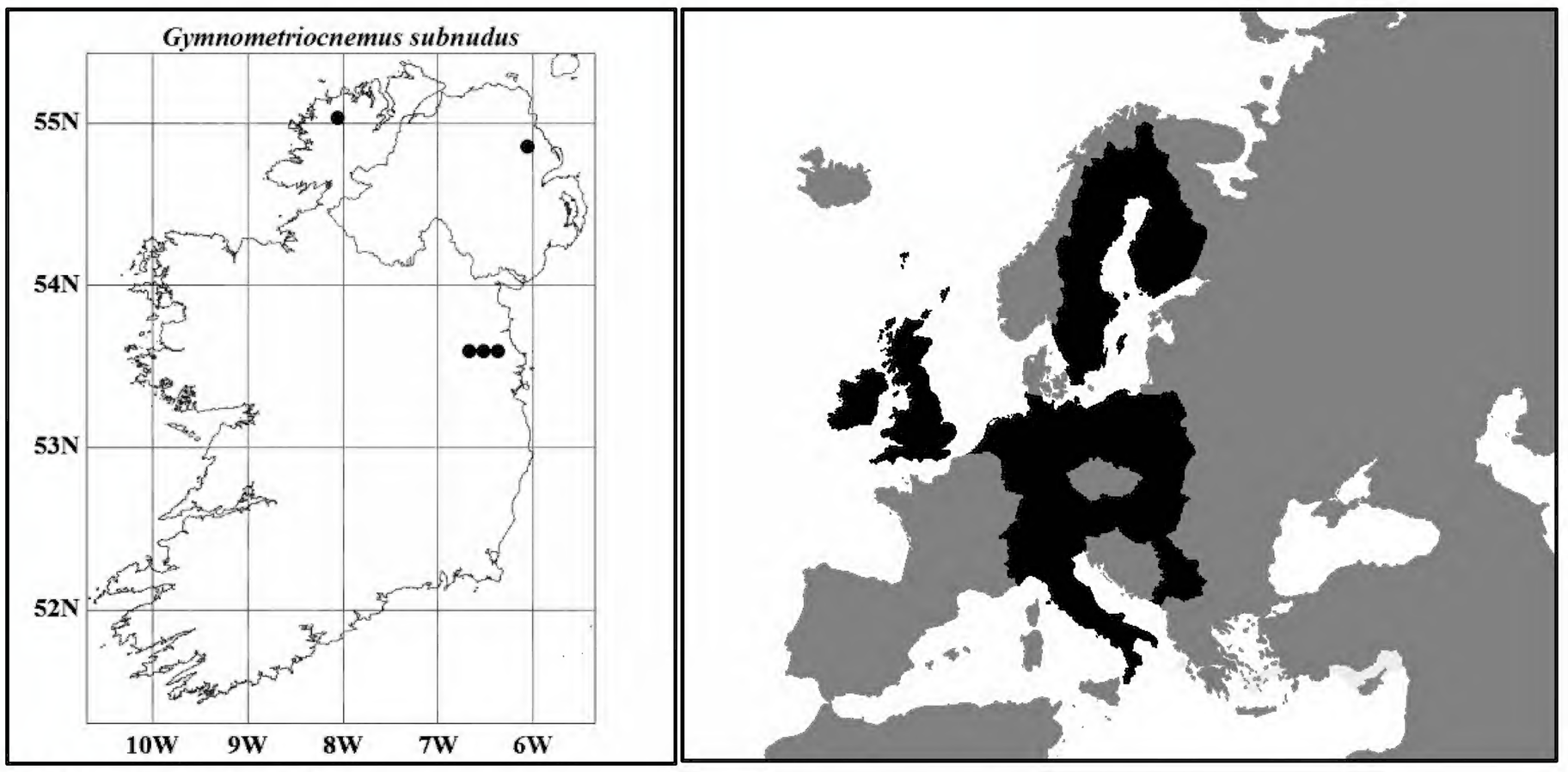
FIGURES 325-326. *Eukiefferiella tirolensis* Goetghebuer, 1938.



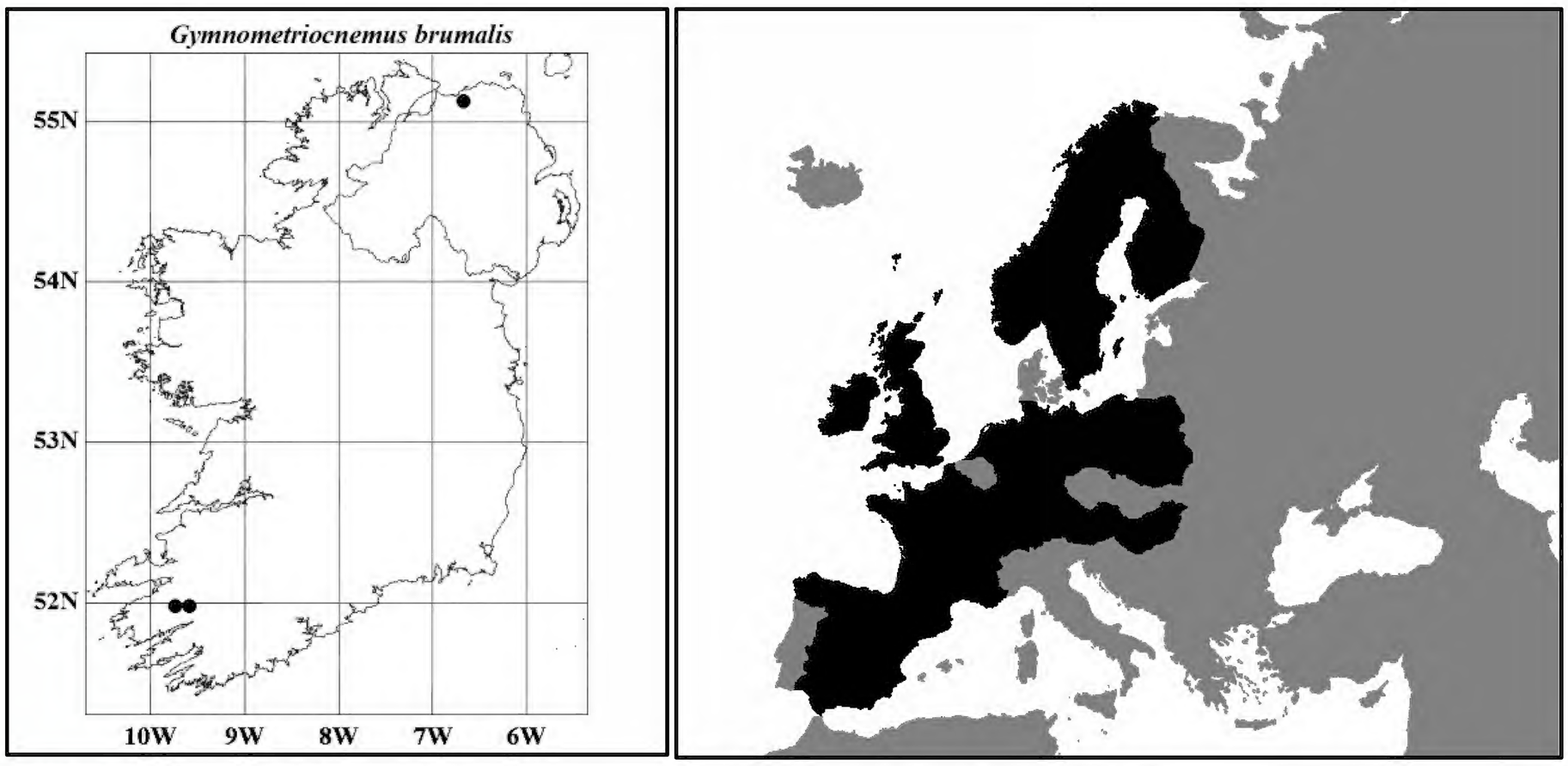
FIGURES 327-328. *Eurycnemus crassipes* (Meigen, 1810).



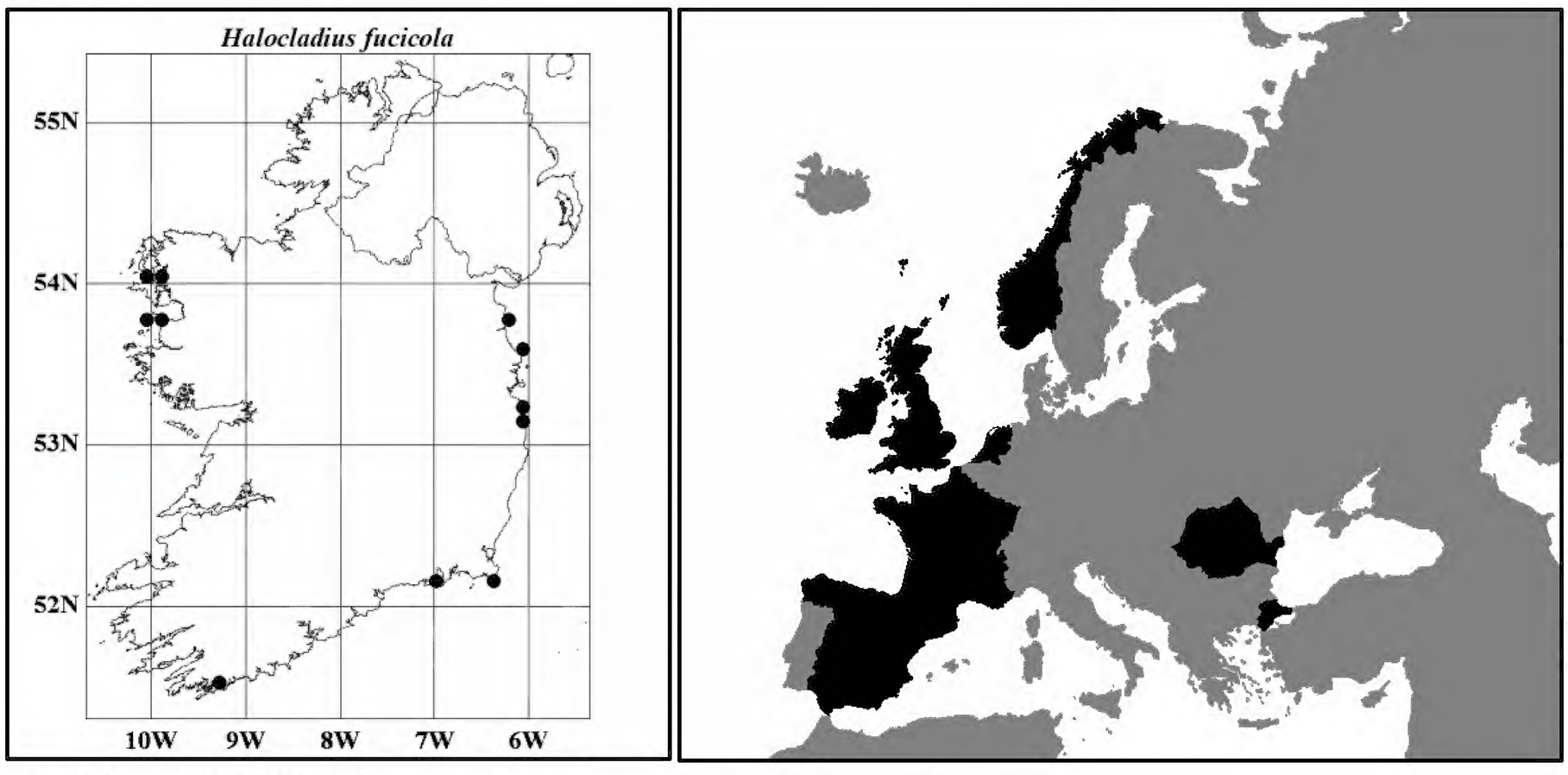
FIGURES 329-330. *Georthocladius luteicornis* (Goetghebuer, 1941).



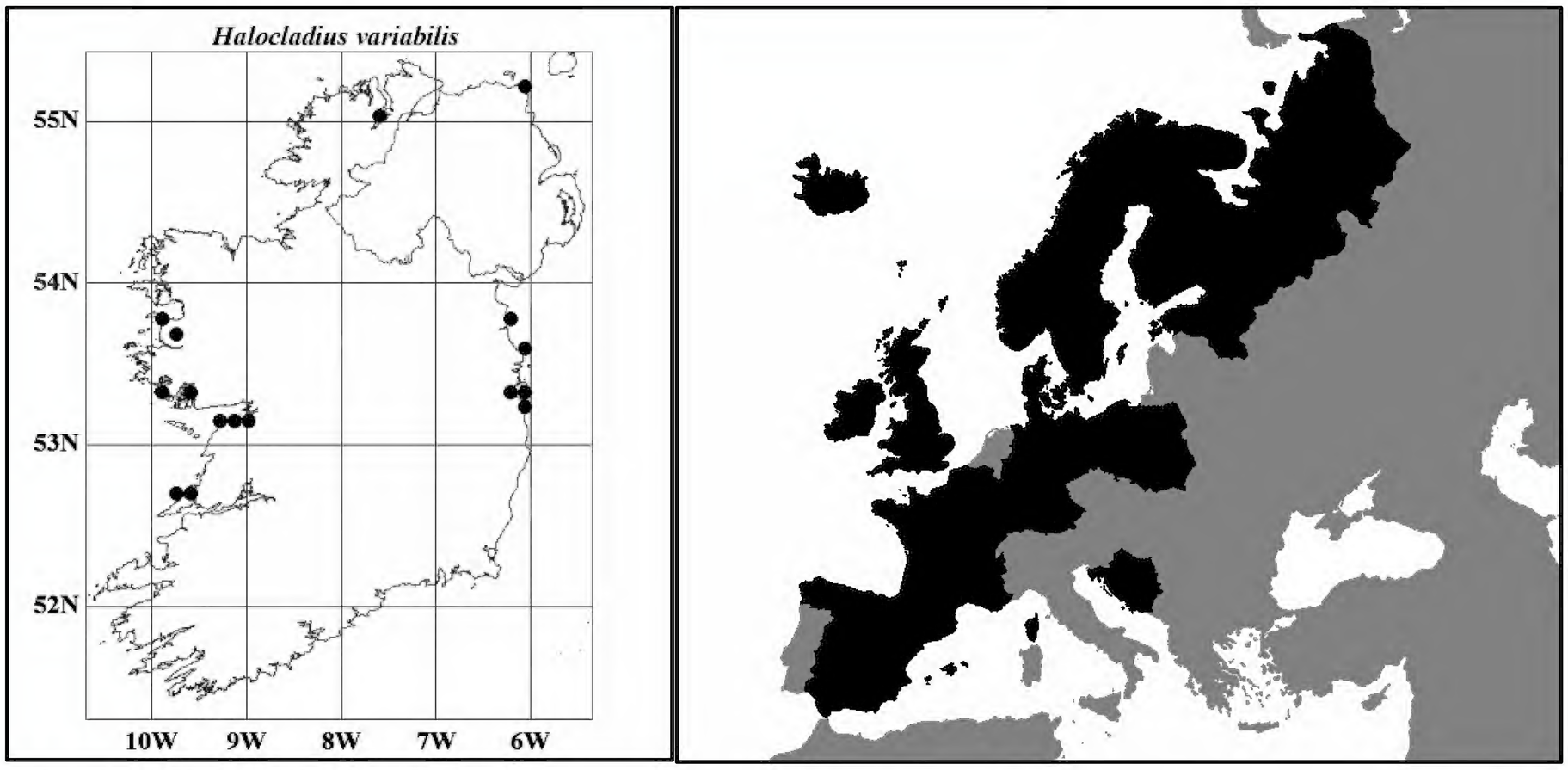
FIGURES 331-332. *Gymnometriocnemus subnudus* (Edwards, 1929).



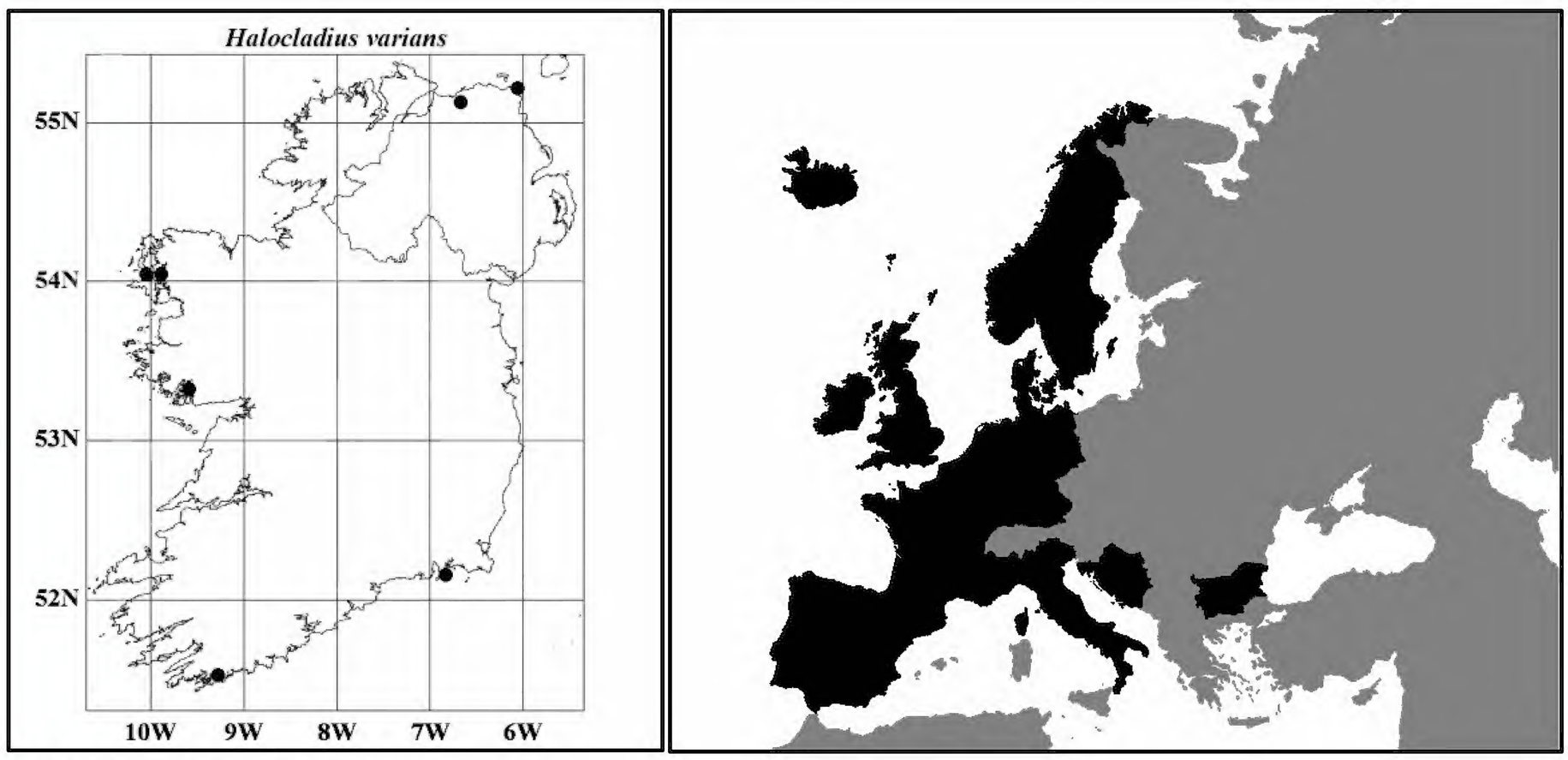
FIGURES 333-334. *Gymnometriocnemus brumalis* (Edwards, 1929).



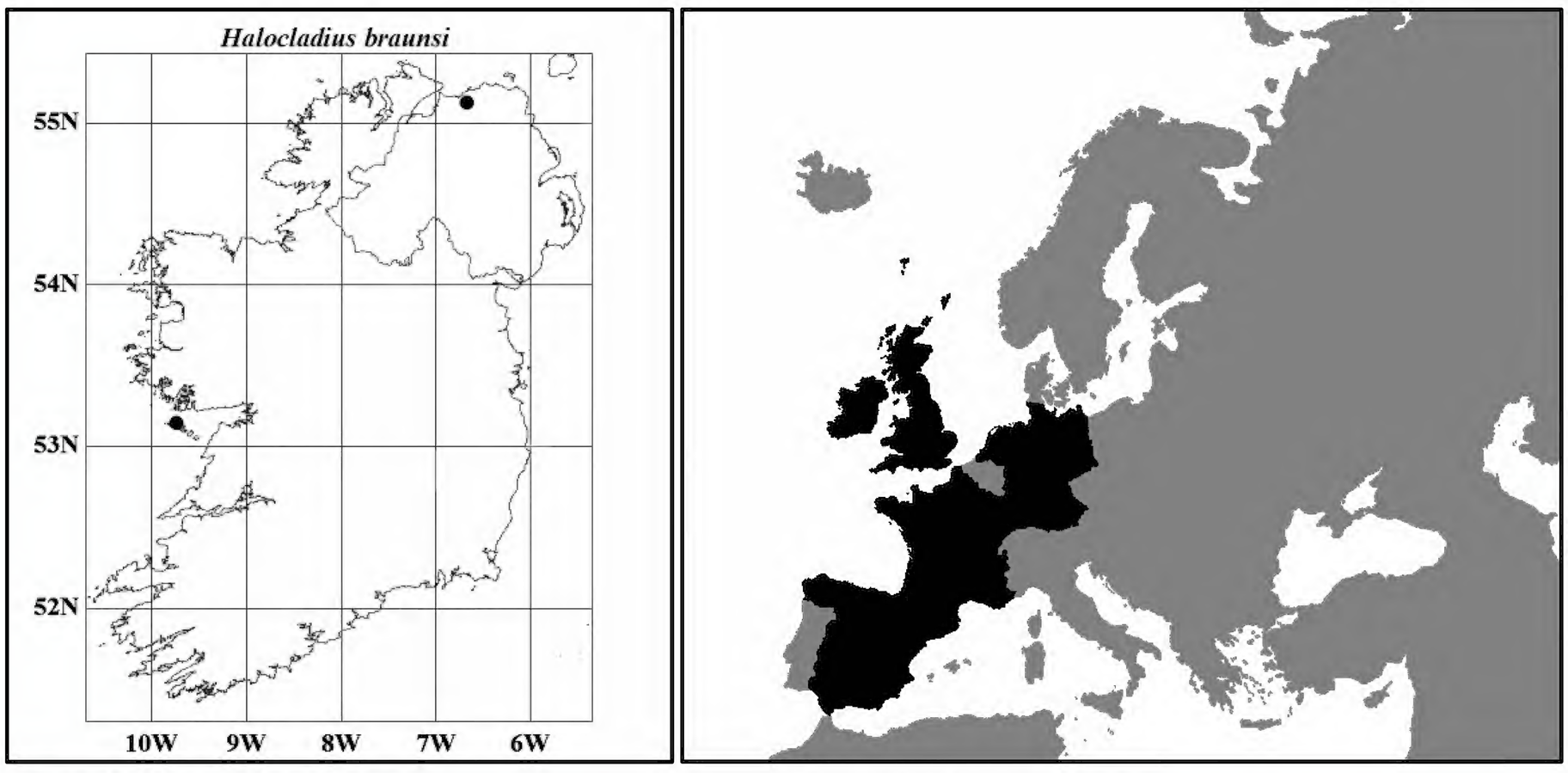
FIGURES 335-336. *Halocladius fucicola* (Edwards, 1926).



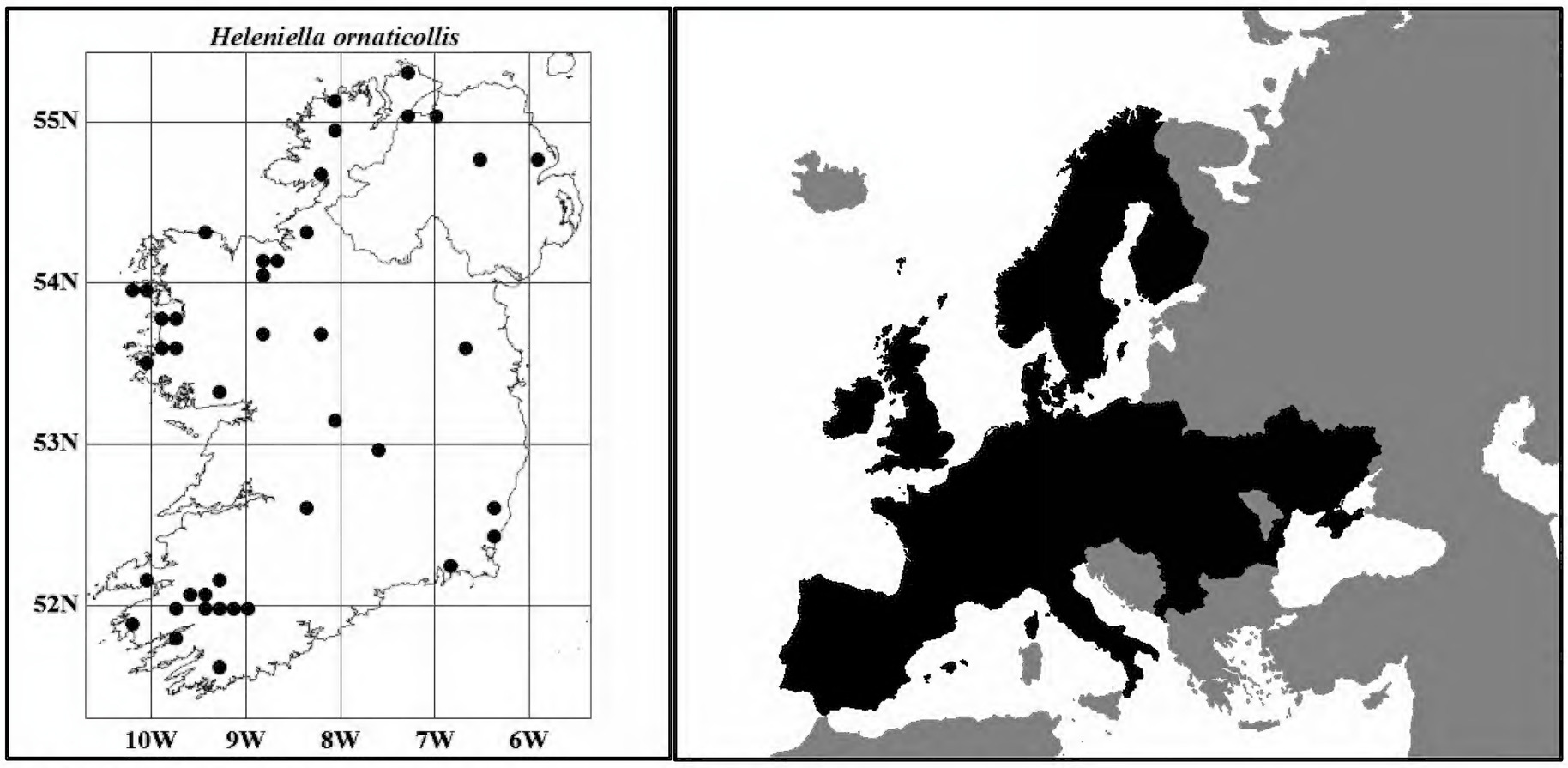
FIGURES 337-338. *Halocladius variabilis* (Staeger, 1839).



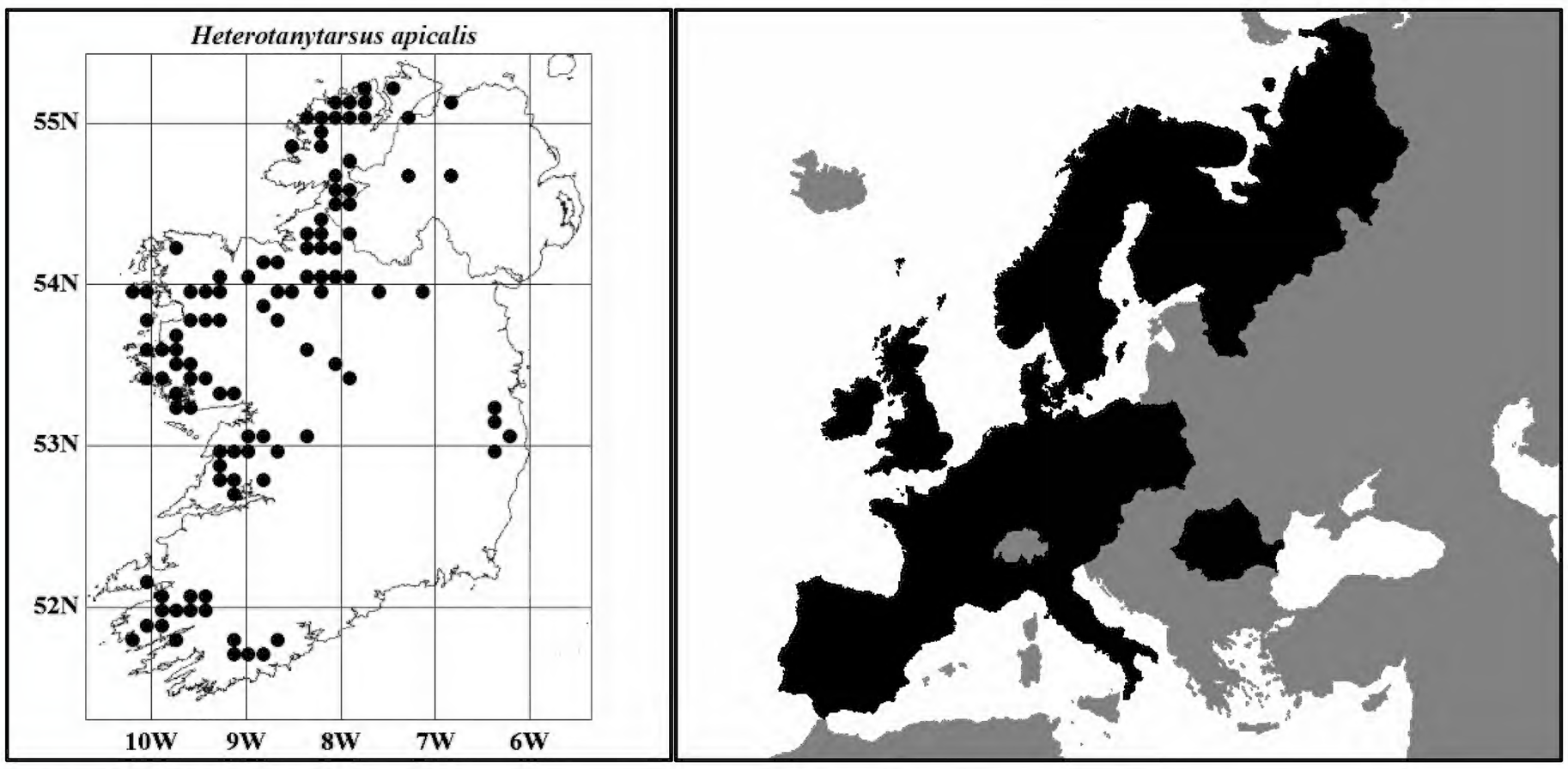
FIGURES 339-340. *Halocladius varians* (Staeger, 1839).



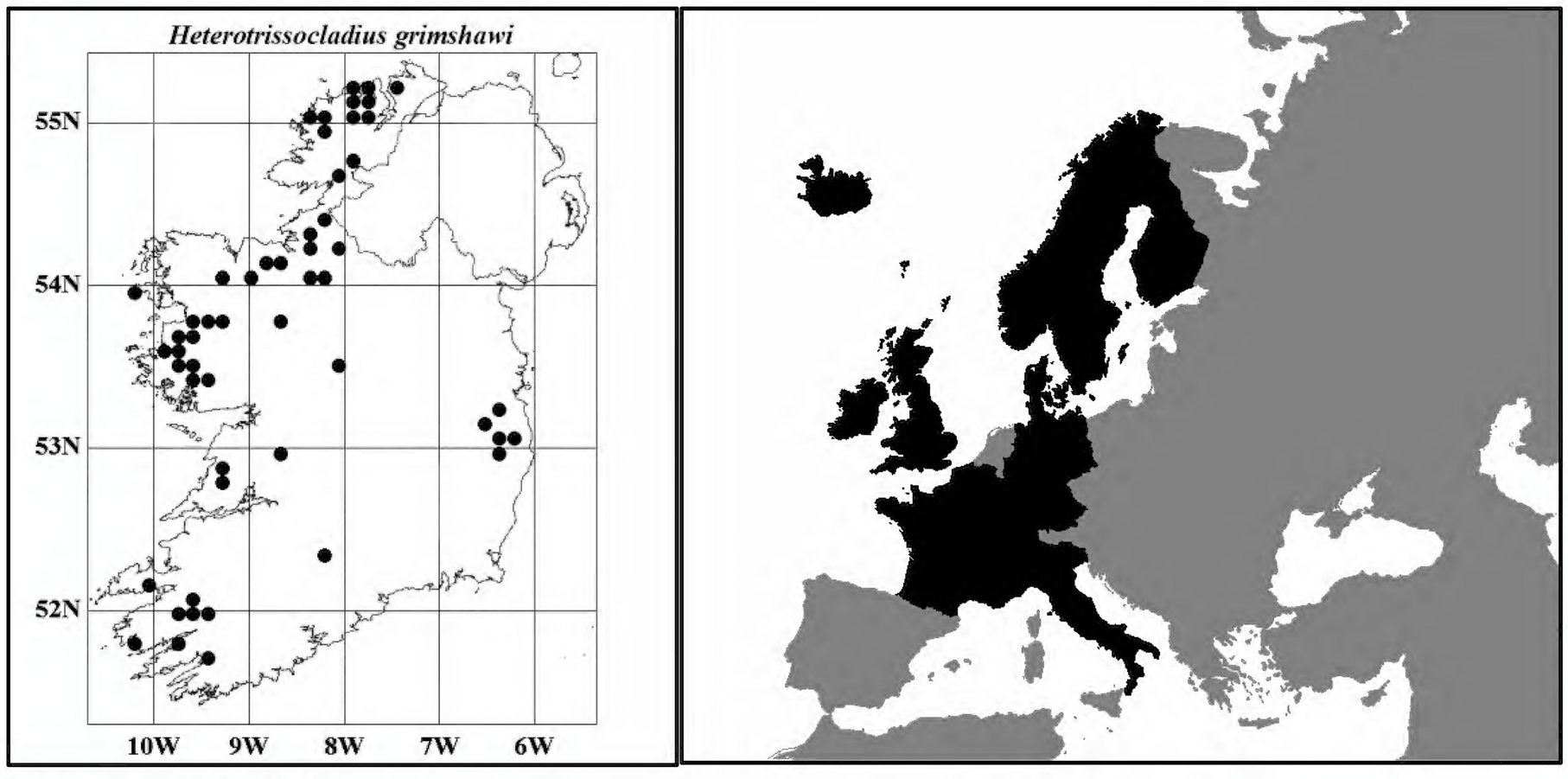
FIGURES 341-342. *Halocladius braunsi* (Goetghebuer, 1942).



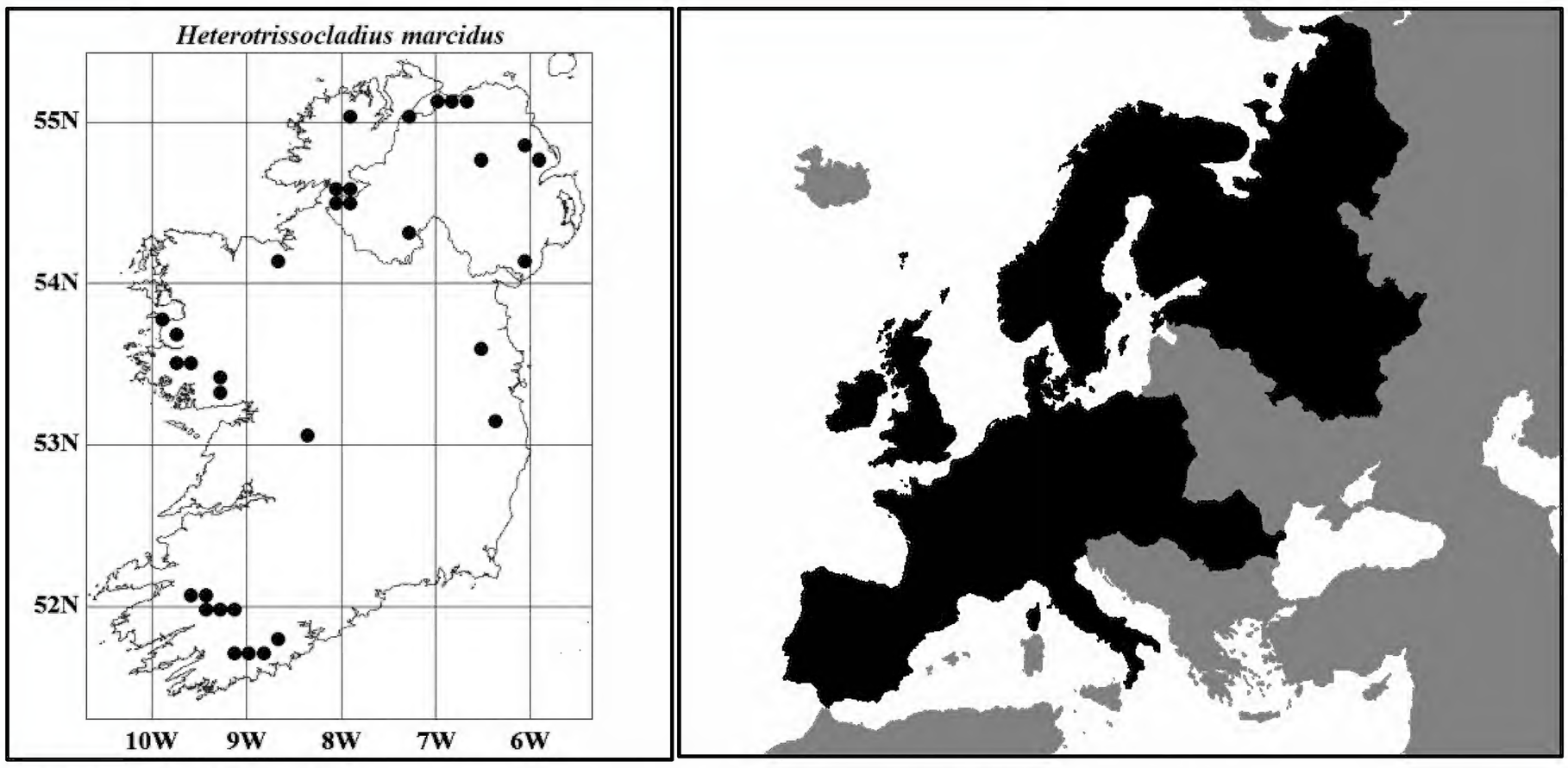
FIGURES 343-344. *Heleniella ornaticollis* (Edwards, 1929).



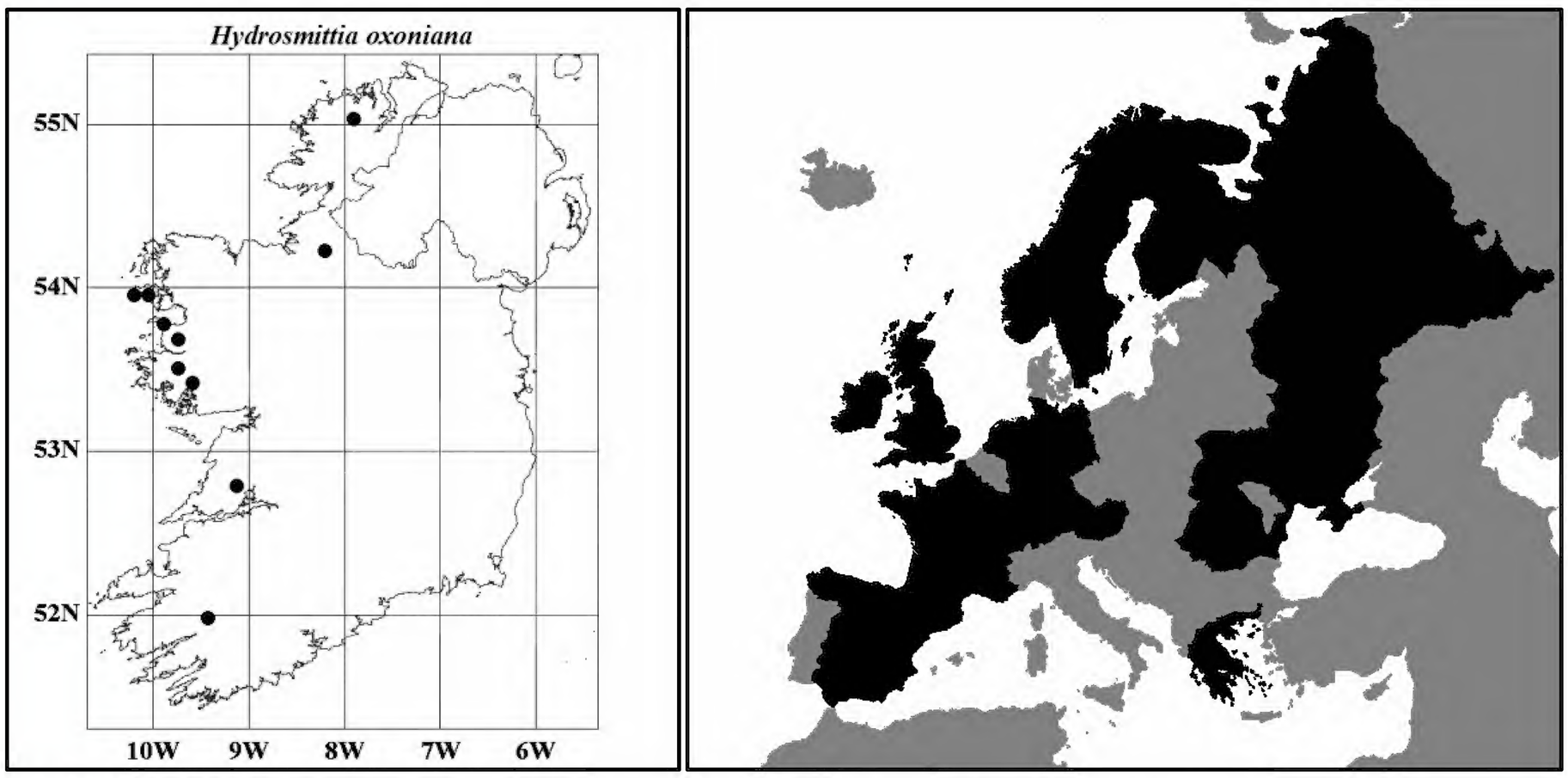
FIGURES 345-346. *Heterotanytarsus apicalis* (Kieffer, 1921).



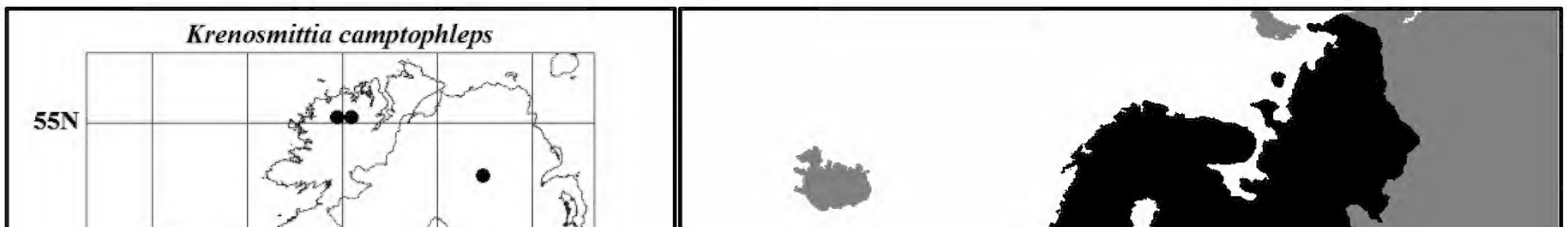
FIGURES 347-348. *Heterotrissocladius grimshawi* (Edwards, 1929).



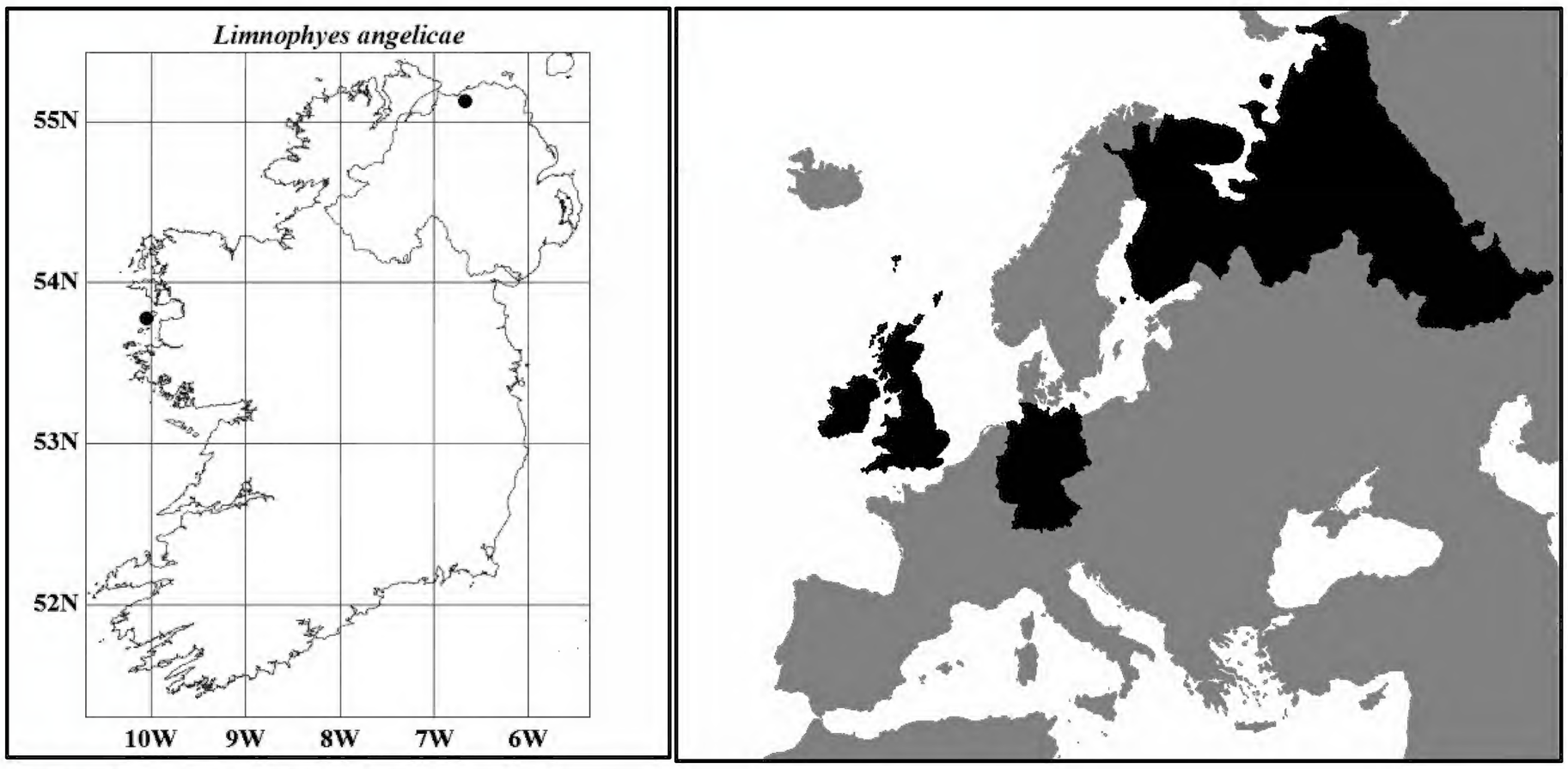
FIGURES 349-350. *Heterotrissocladius marcidus* (Walker, 1856).



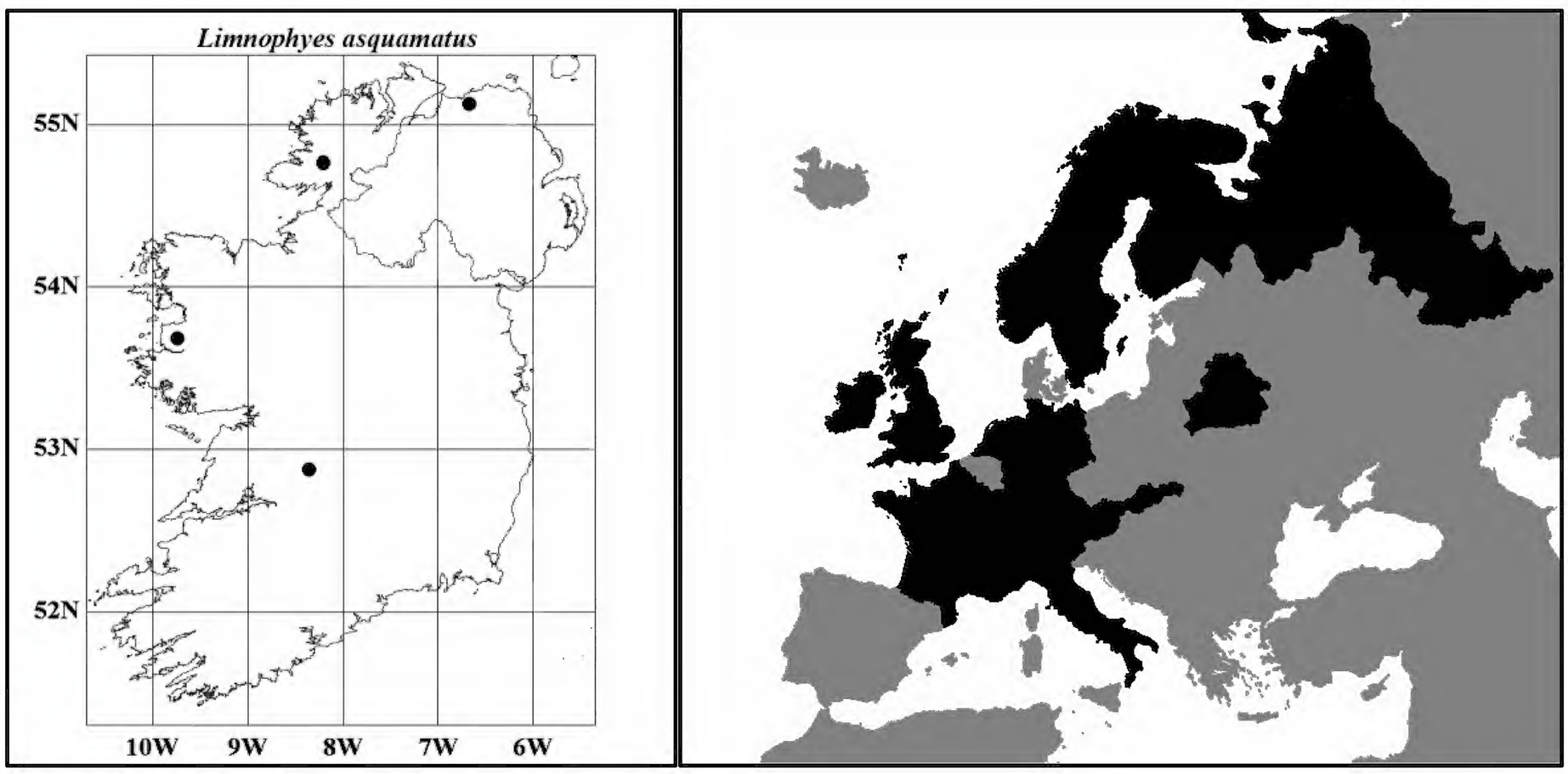
FIGURES 351-352. *Hydrosmittia oxoniana* (Edwards, 1922).



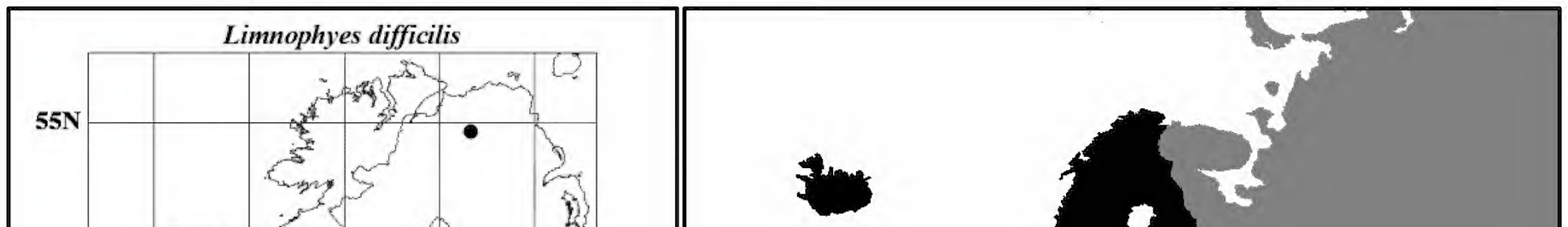
FIGURES 353-354. *Krenosmittia camptophleps* (Edwards, 1929).



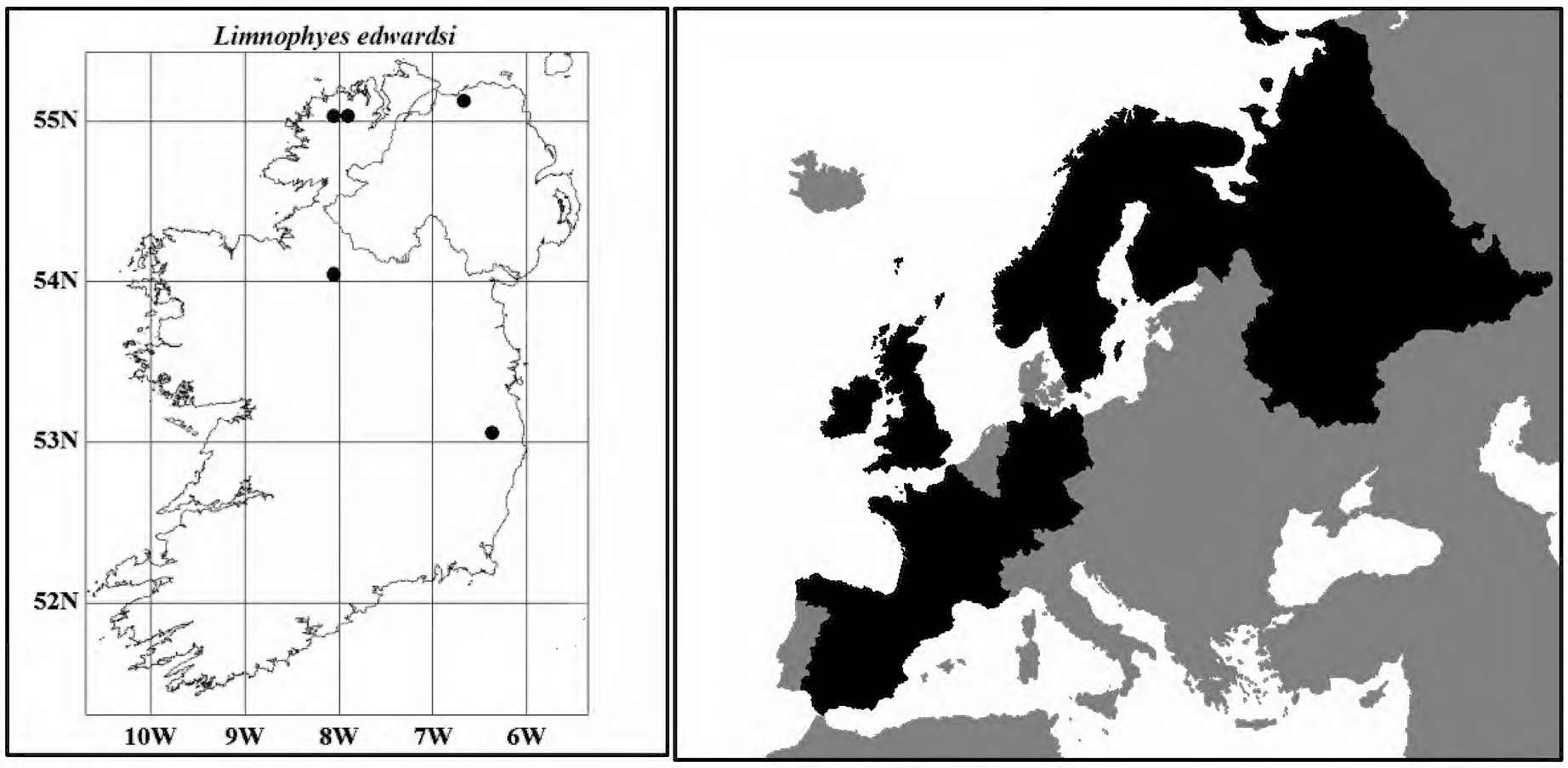
FIGURES 355-356. *Limnophyes angelicae* Sæther, 1990.



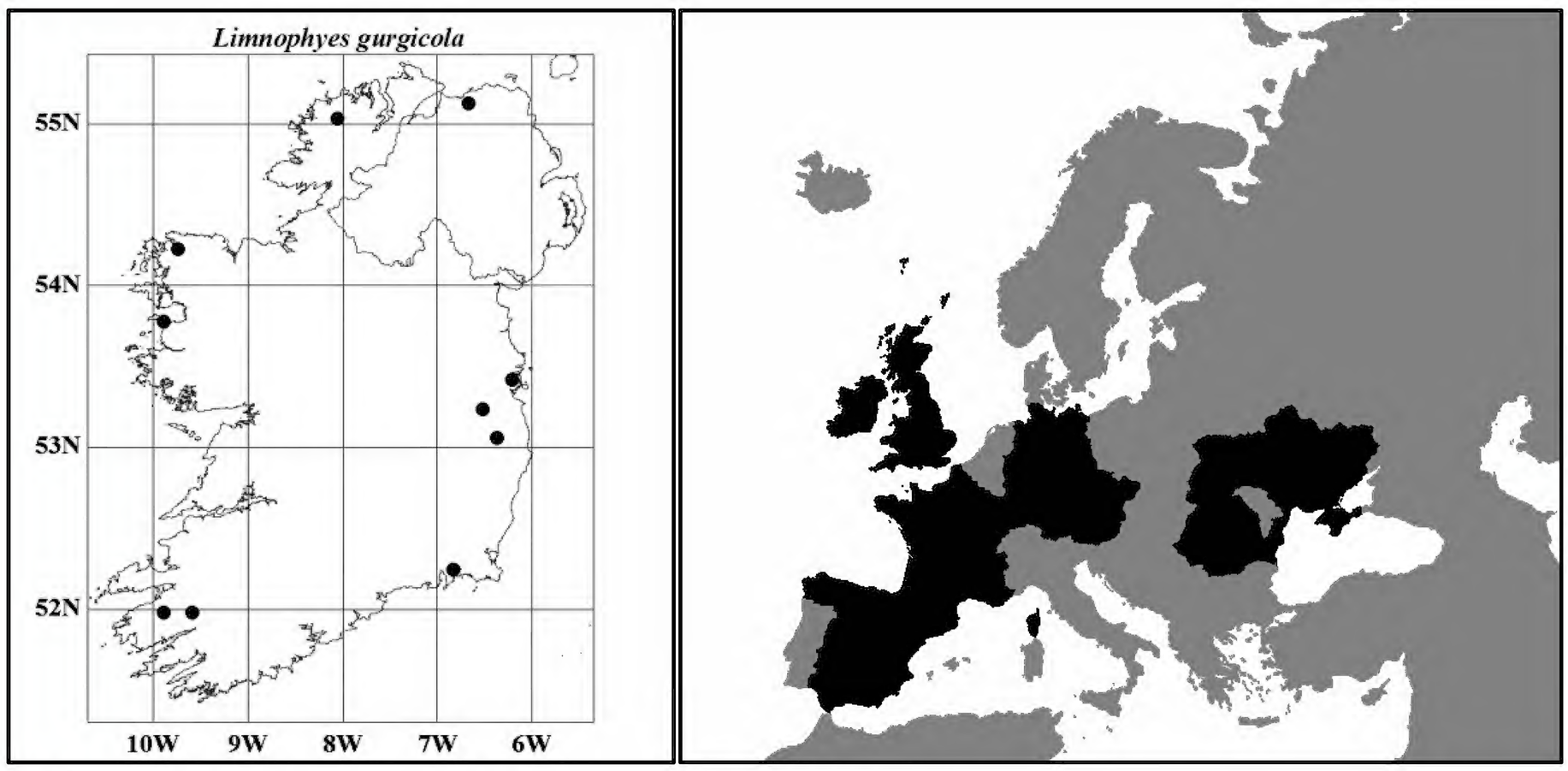
FIGURES 357-358. *Limnophyes asquamatus* Andersen, 1937.



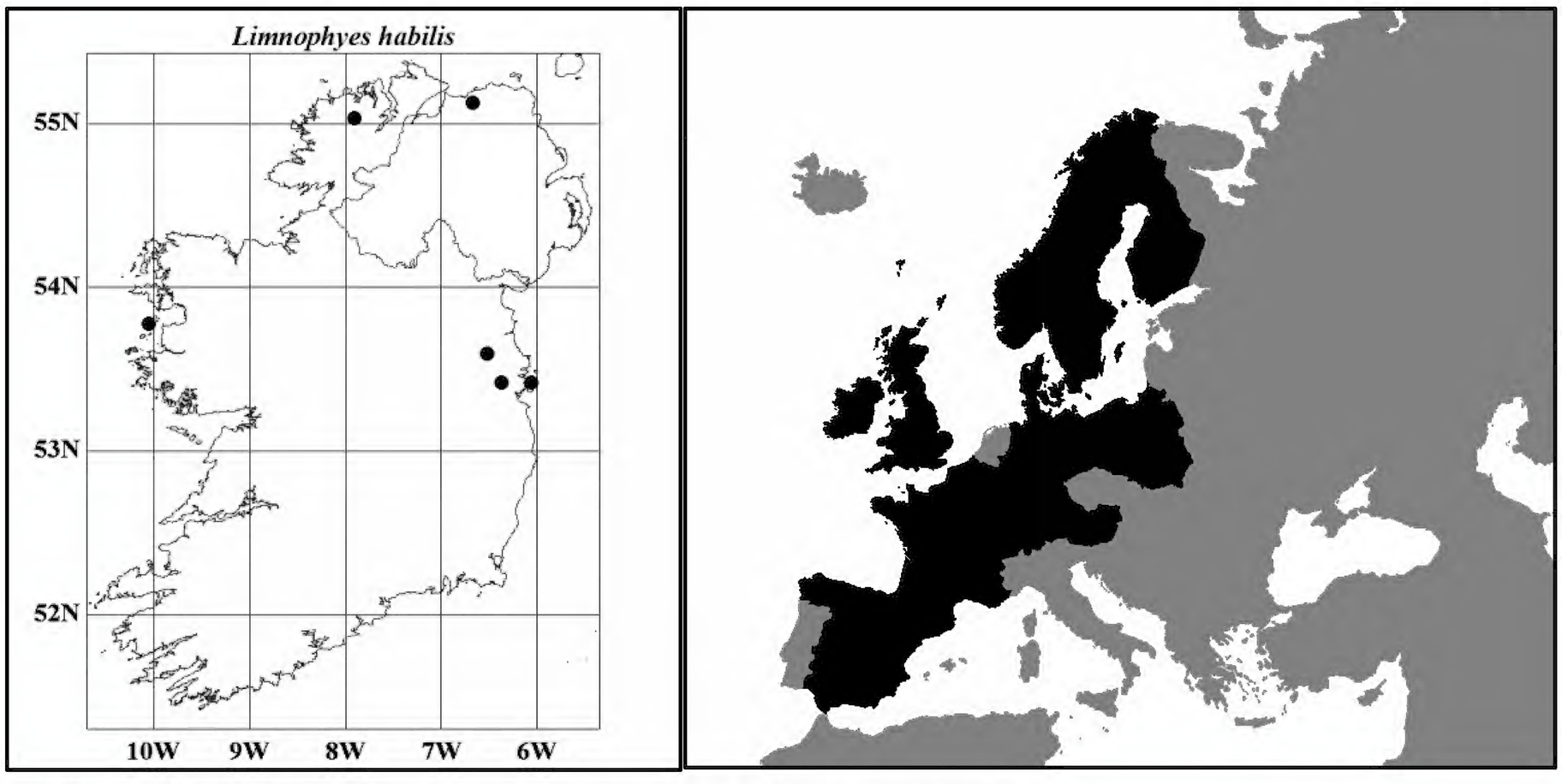
FIGURES 359-360. *Limnophyes difficilis* Brundin, 1947.



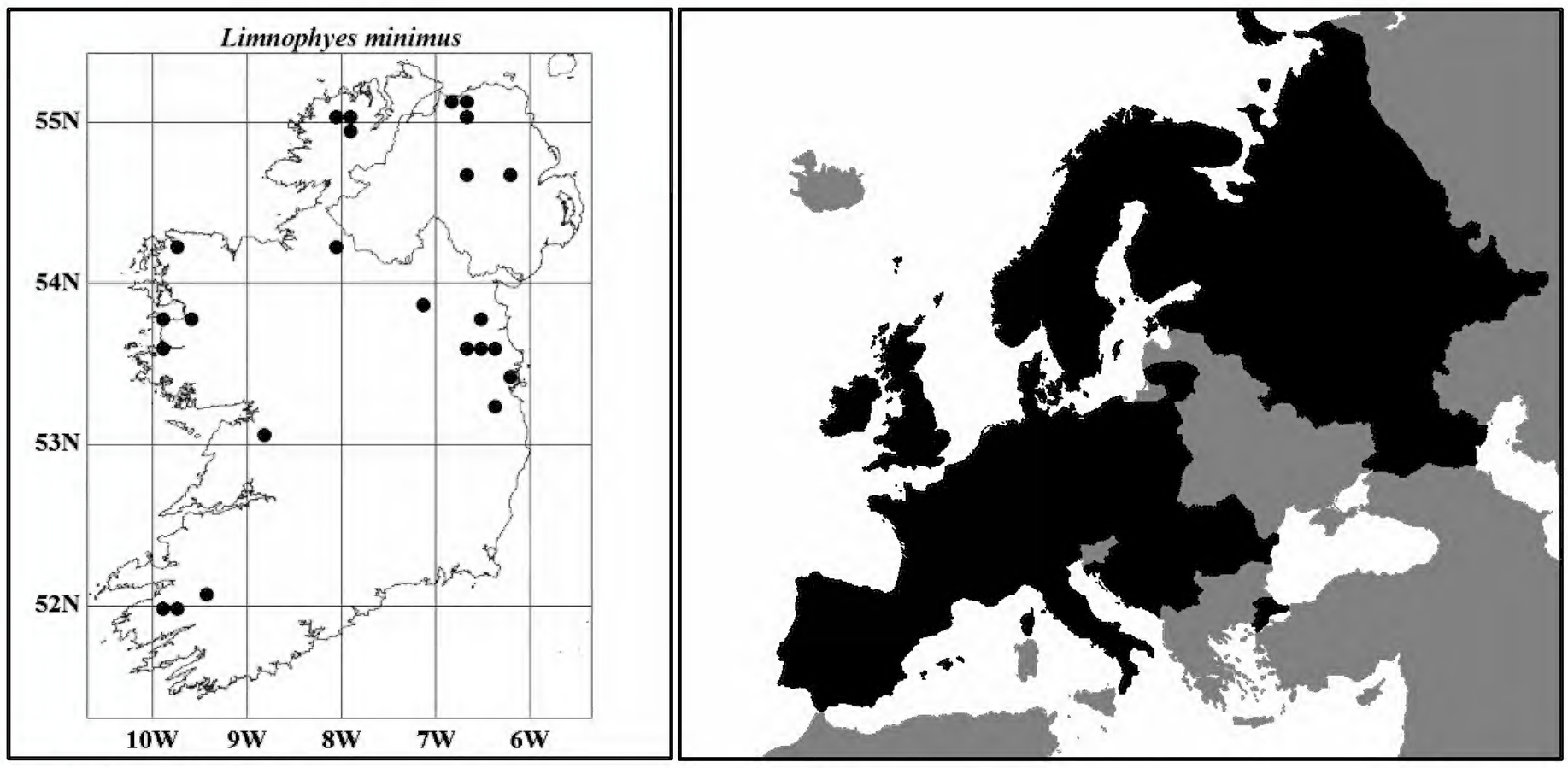
FIGURES 361-362. *Limnophyes edwardsi* Sæther, 1990.



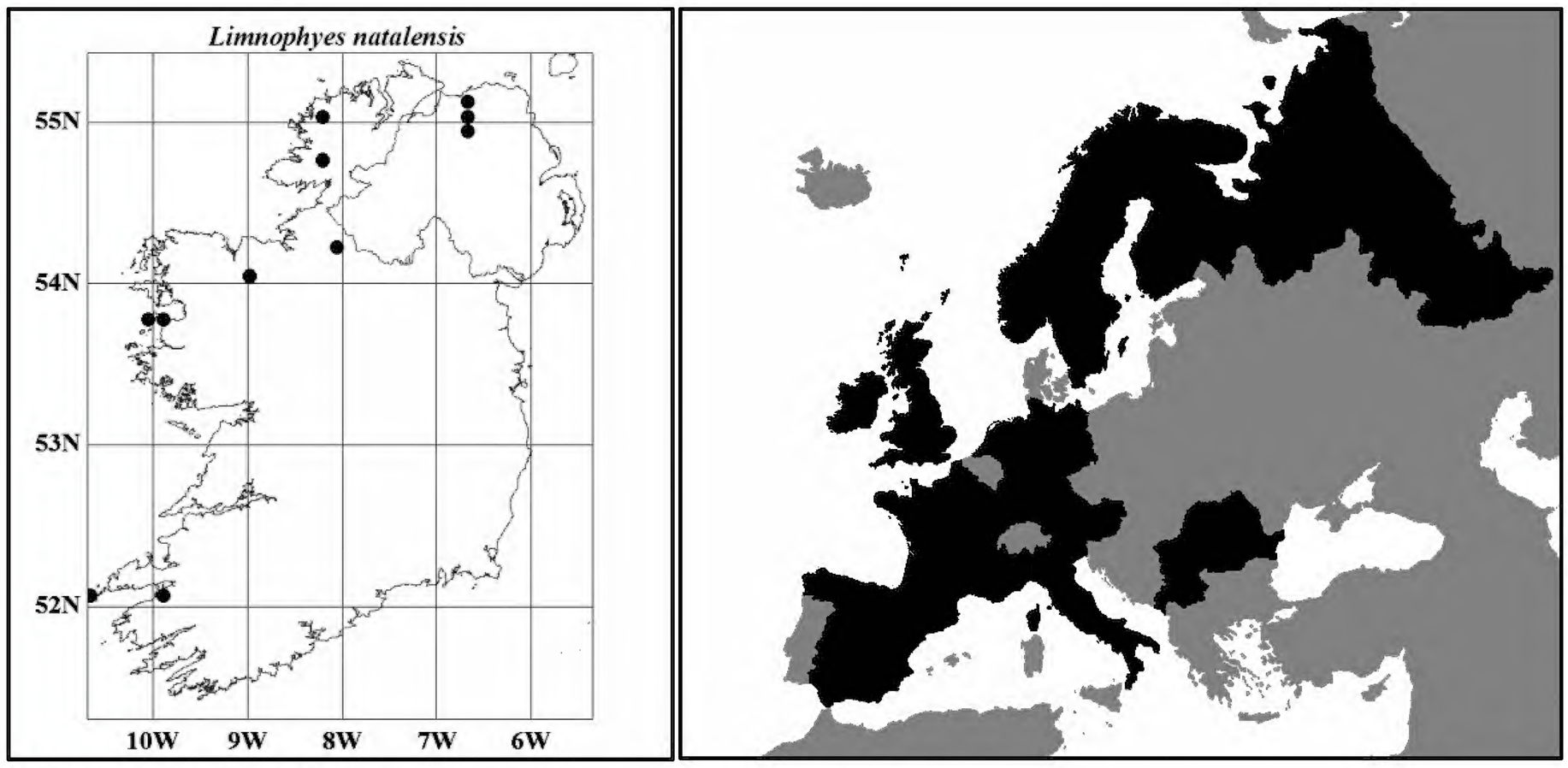
FIGURES 363-364. *Limnophyes gurgicola* (Edwards, 1929).



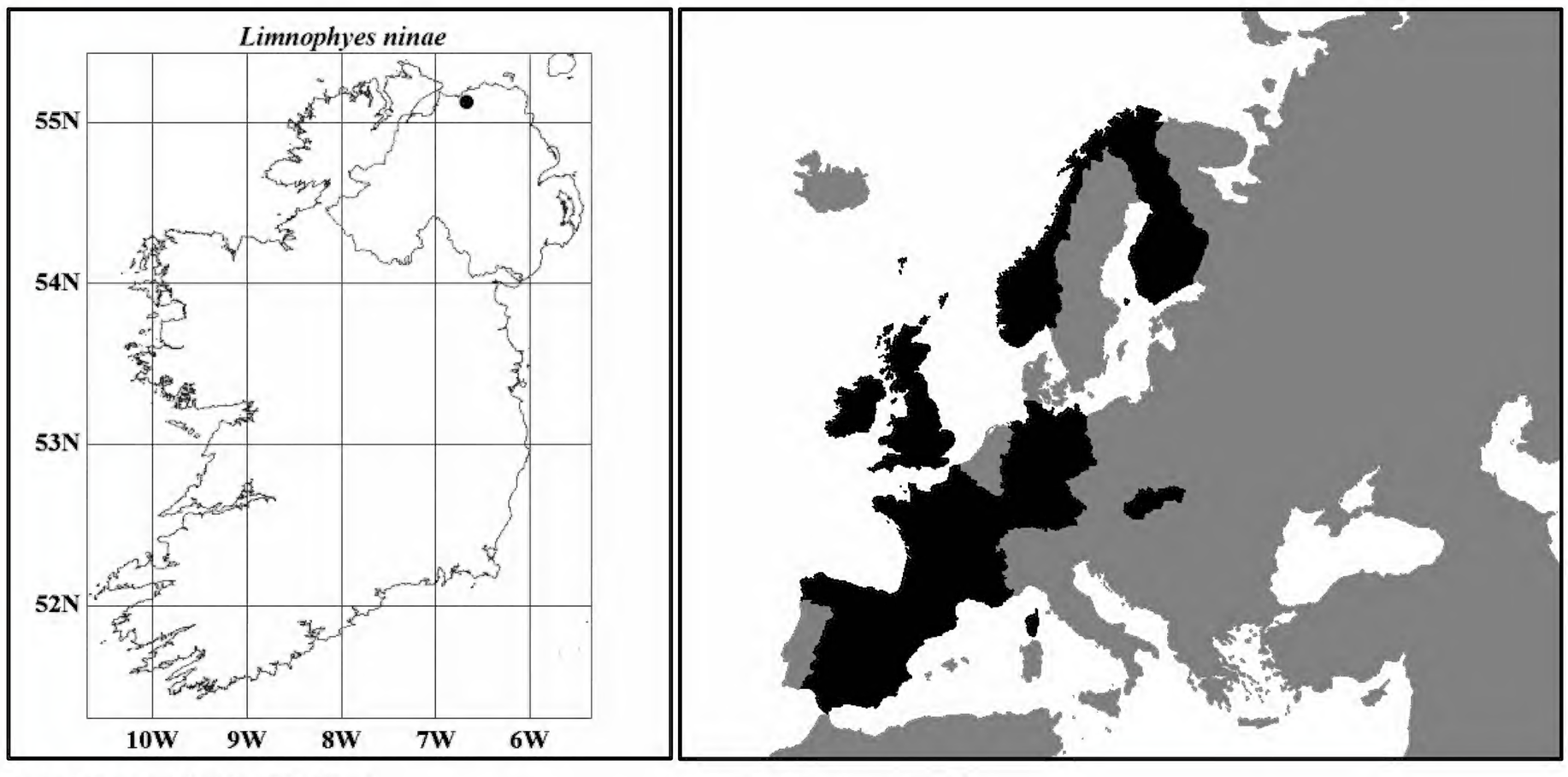
FIGURES 365-366. *Limnophyes habilis* (Walker, 1856).



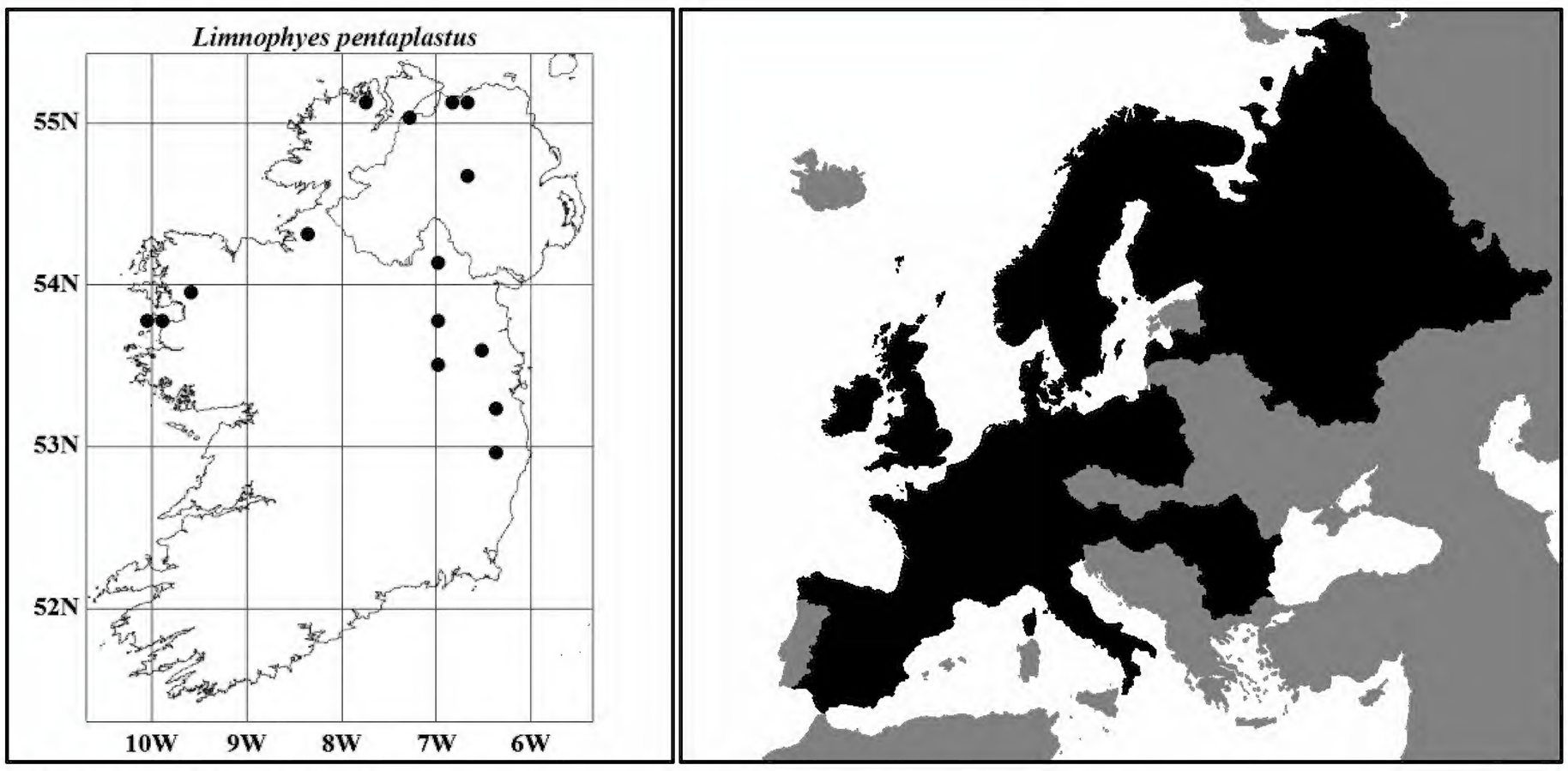
FIGURES 367-368. *Limnophyes minimus* (Meigen, 1818).



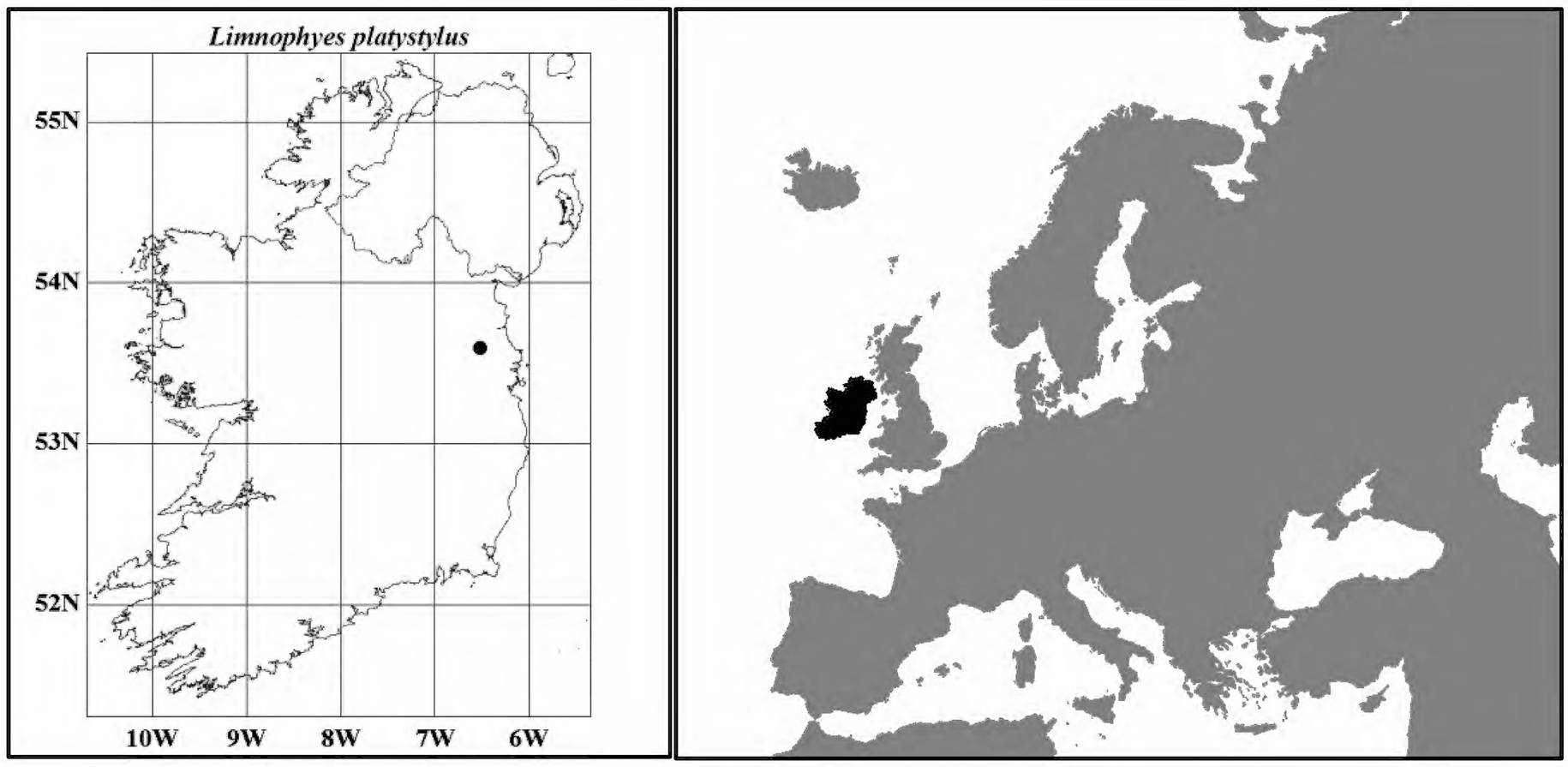
FIGURES 369-370. *Limnophyes natalensis* (Kieffer, 1914).



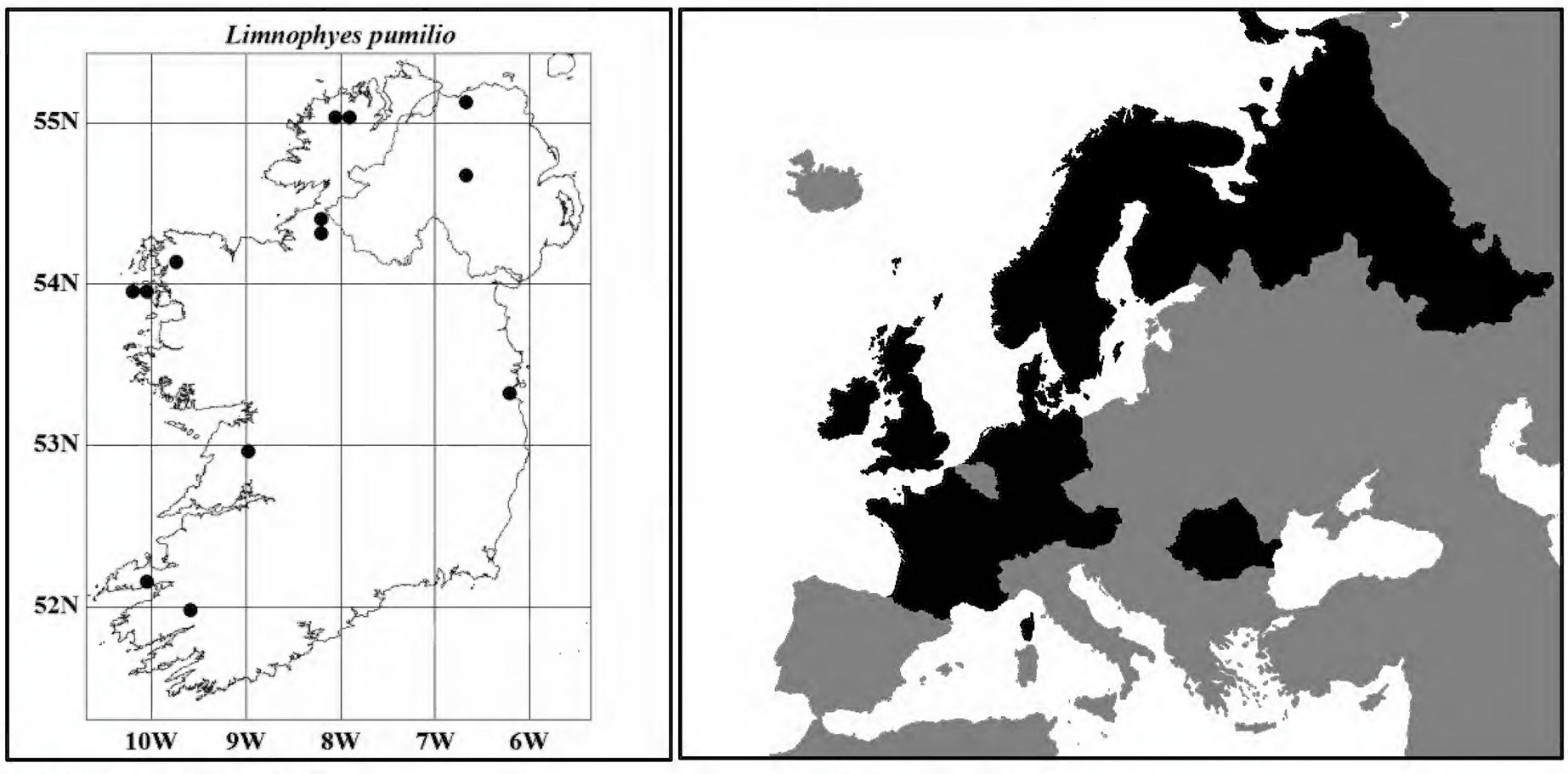
FIGURES 371-372. *Limnophyes ninae* Sæther, 1975.



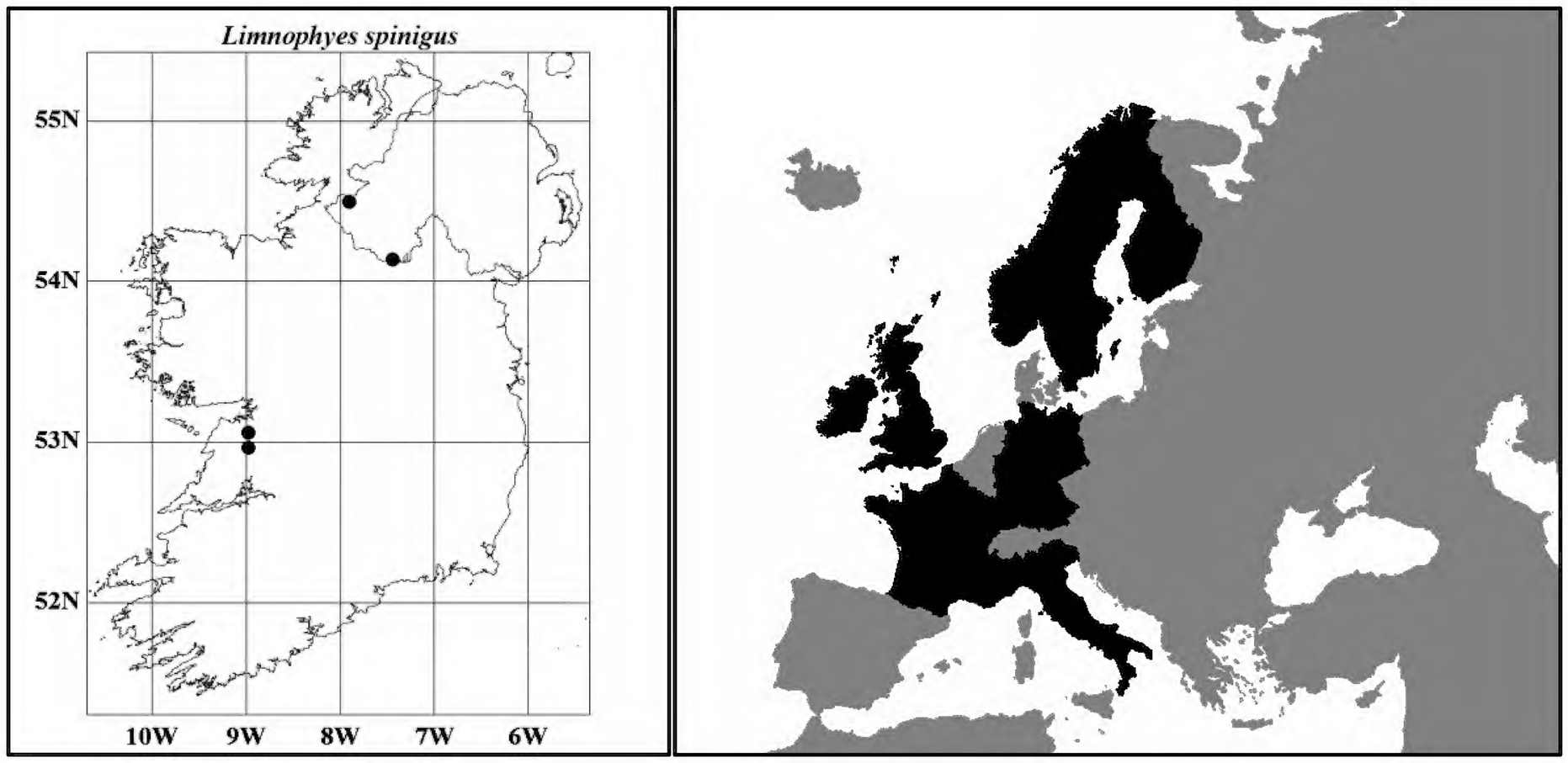
FIGURES 373-374. *Limnophyes pentaplastus* (Kieffer, 1921).



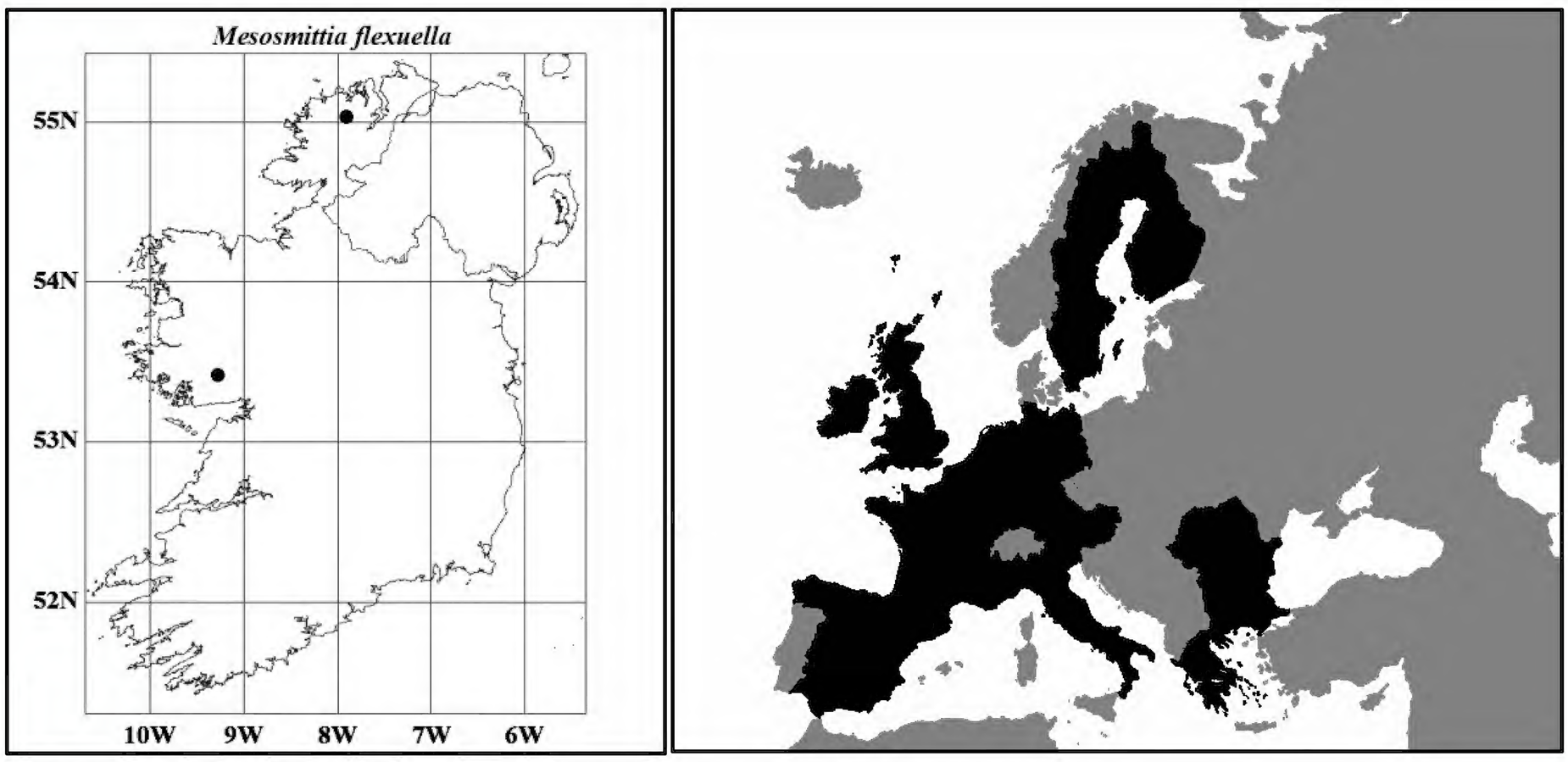
FIGURES 375-376. *Limnophyes platystylus* Murray, 2007.



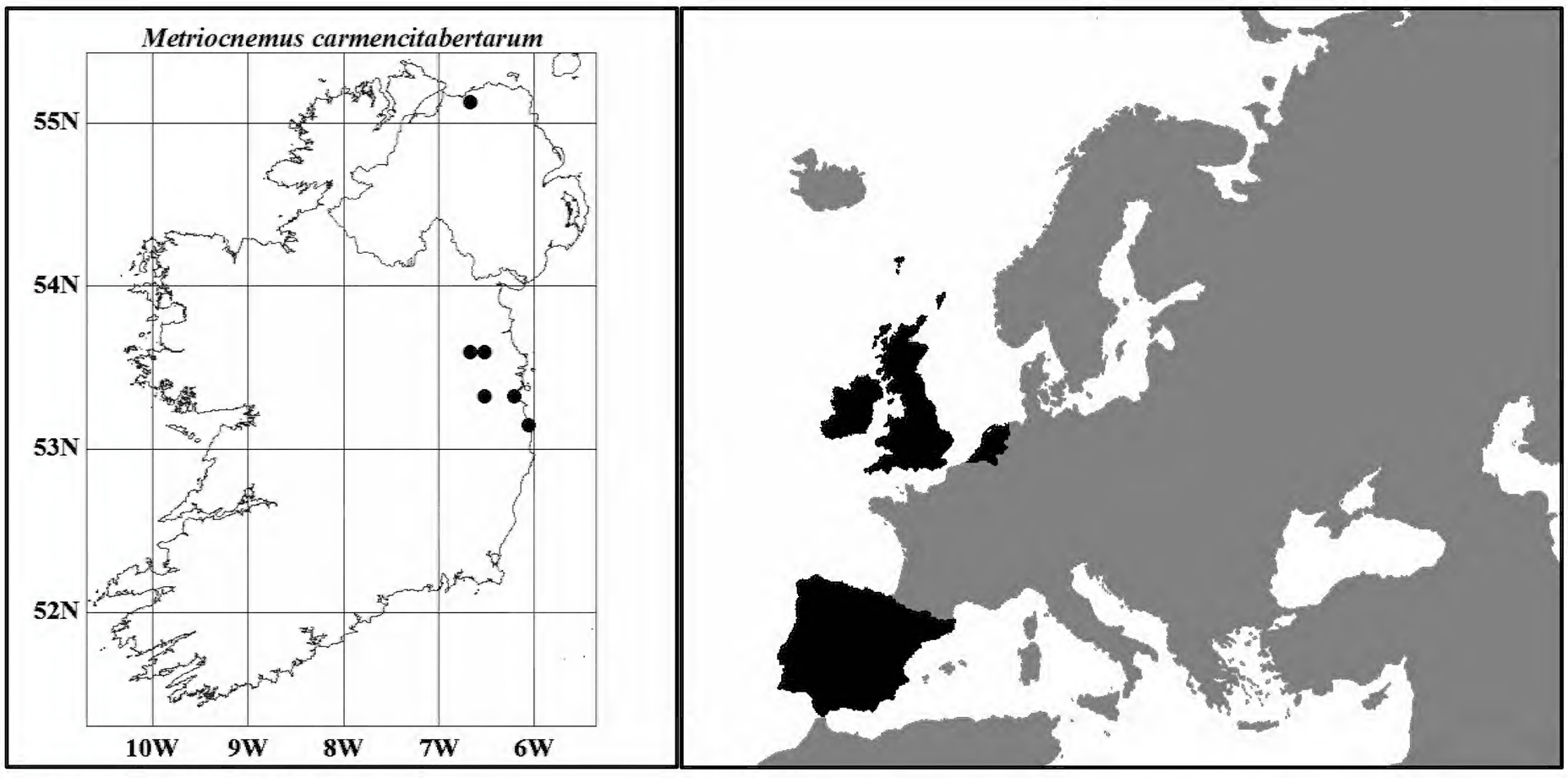
FIGURES 377-378. *Limnophyes pumilio* (Holmgren, 1869).



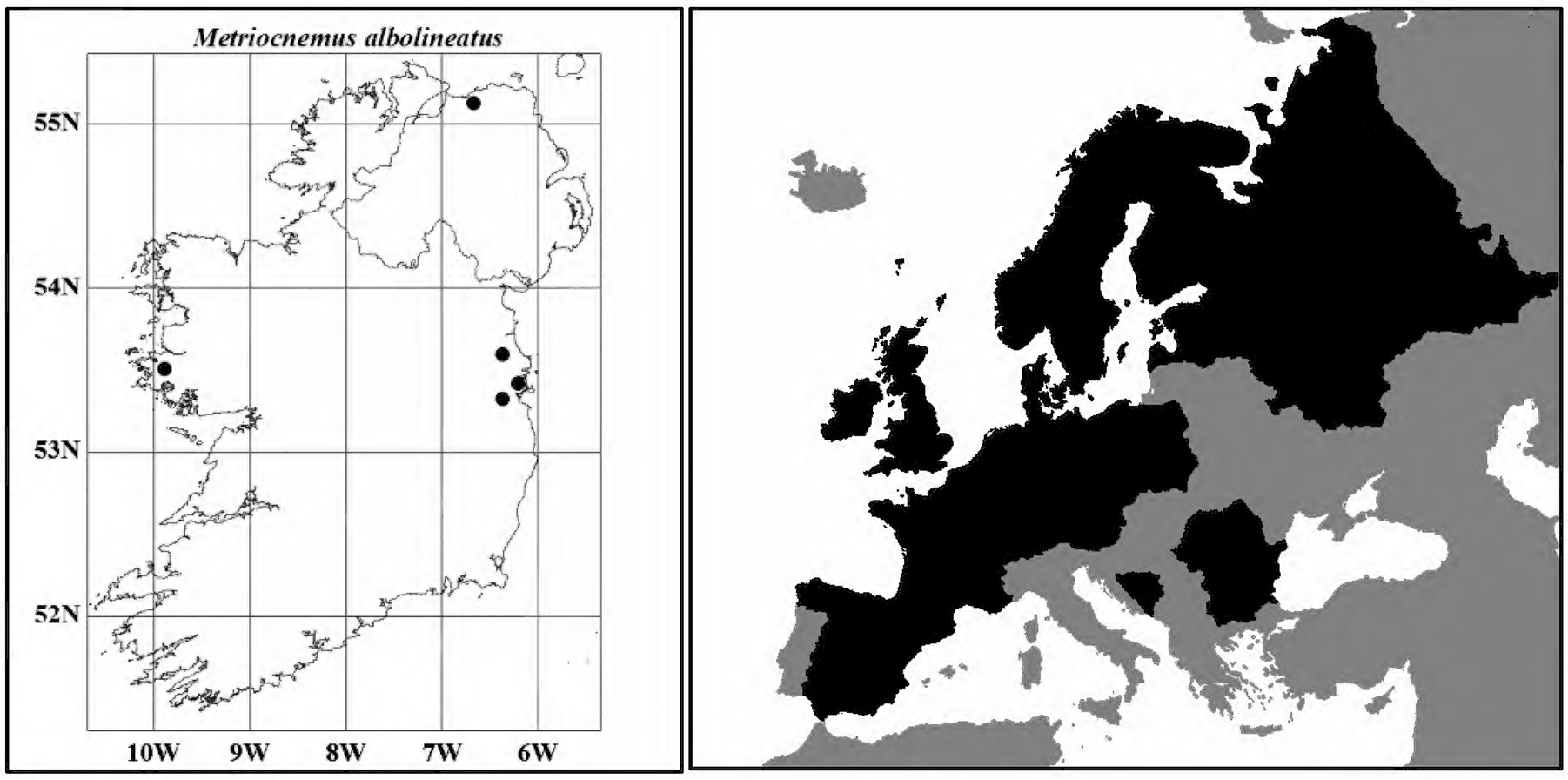
FIGURES 379-380. *Limnophyes spinigus* Sæther, 1990.



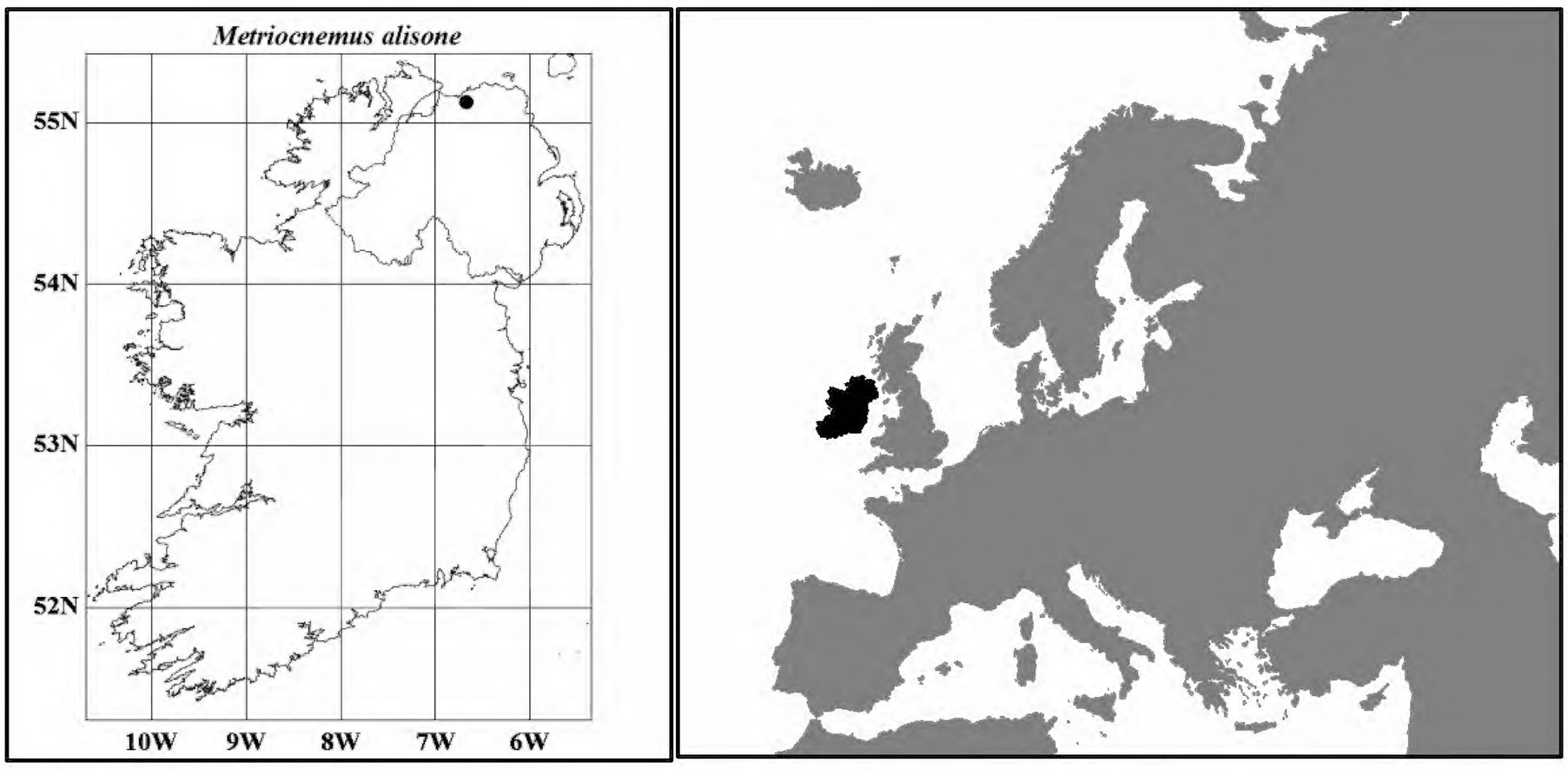
FIGURES 381-382. *Mesosmittia flexuella* (Edwards, 1929).



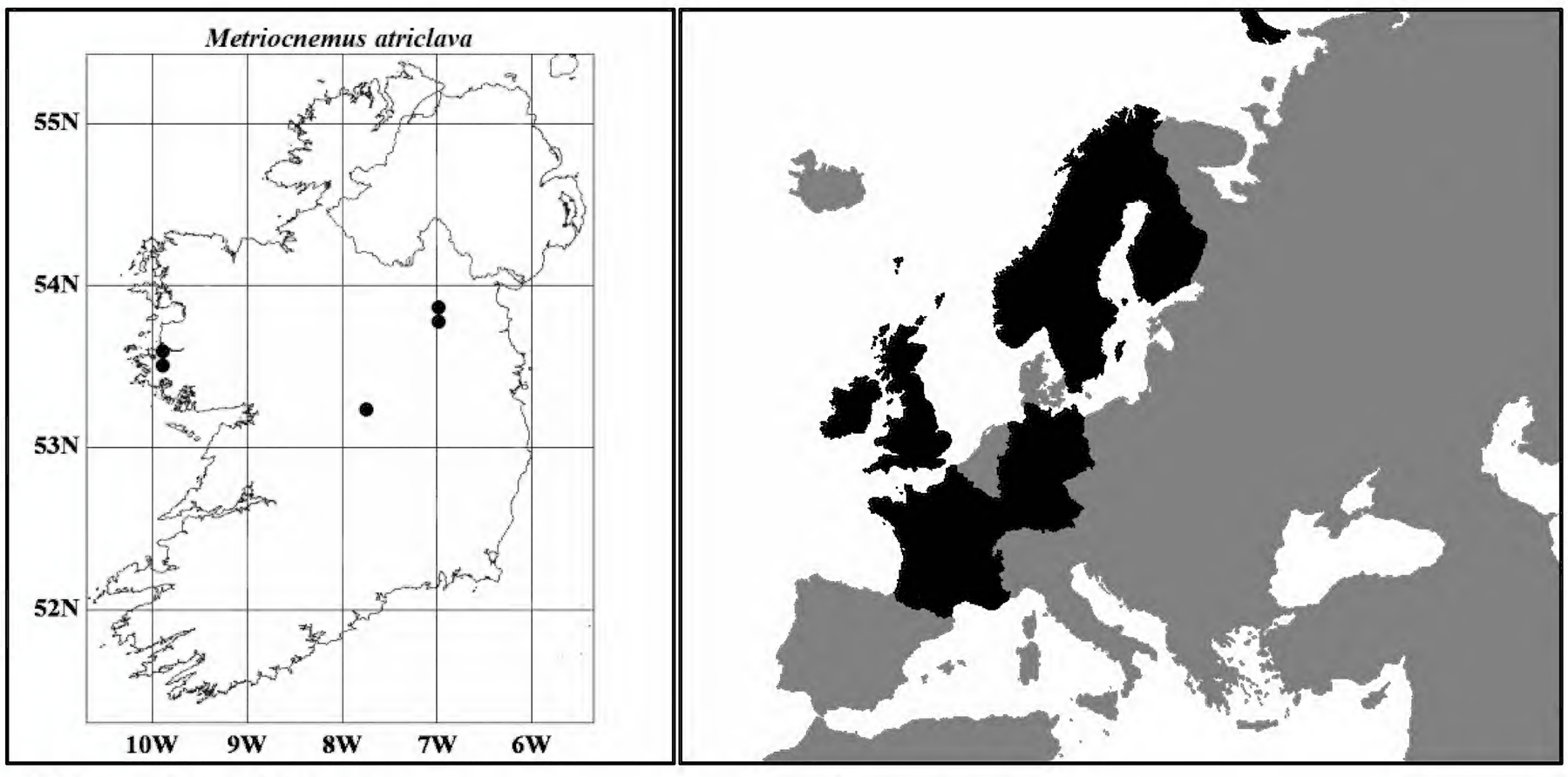
FIGURES 383-384. *Metriocnemus carmencitabertarum* Langton & Cobo, 1997.



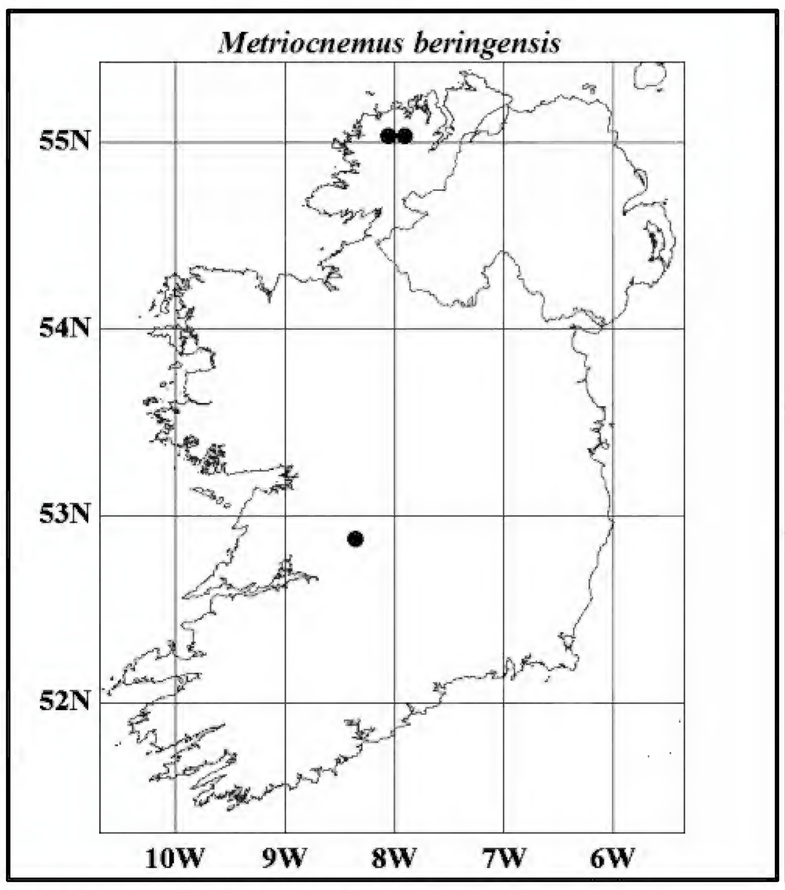
FIGURES 385-386. *Metriocnemus albolineatus* (Meigen, 1818).

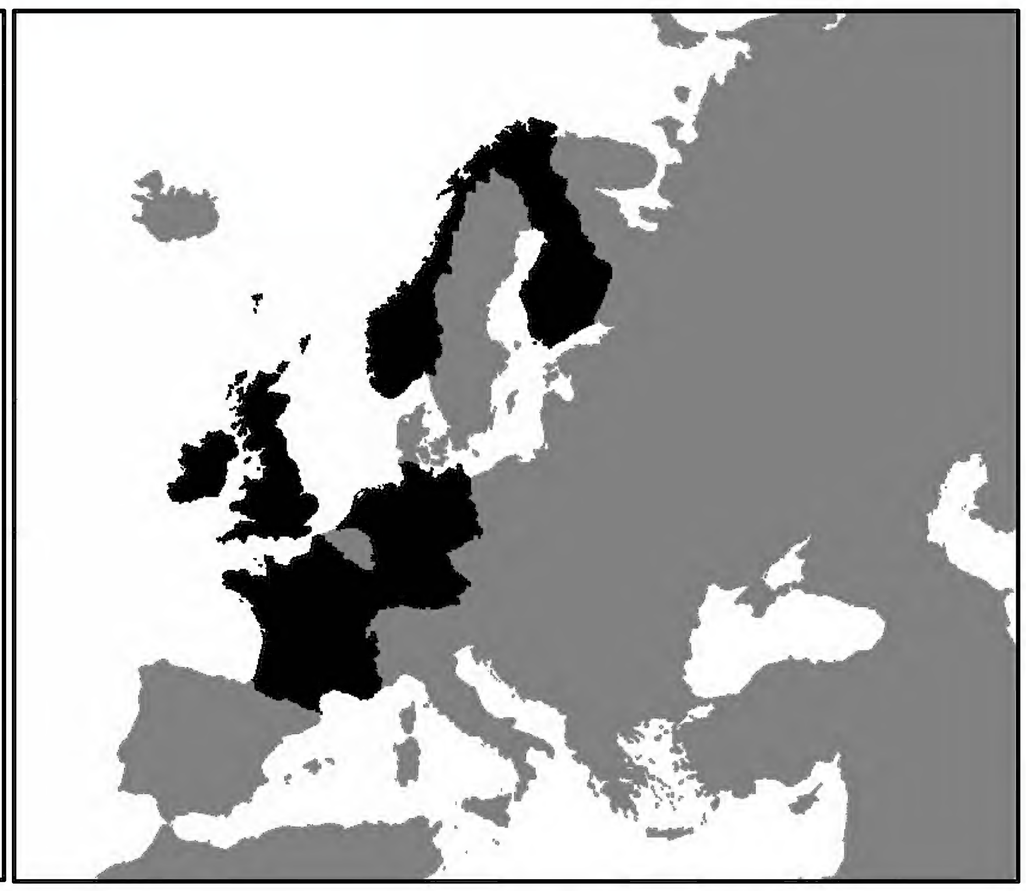


FIGURES 387-388. *Metriocnemus alisonae* Langton, 2013.

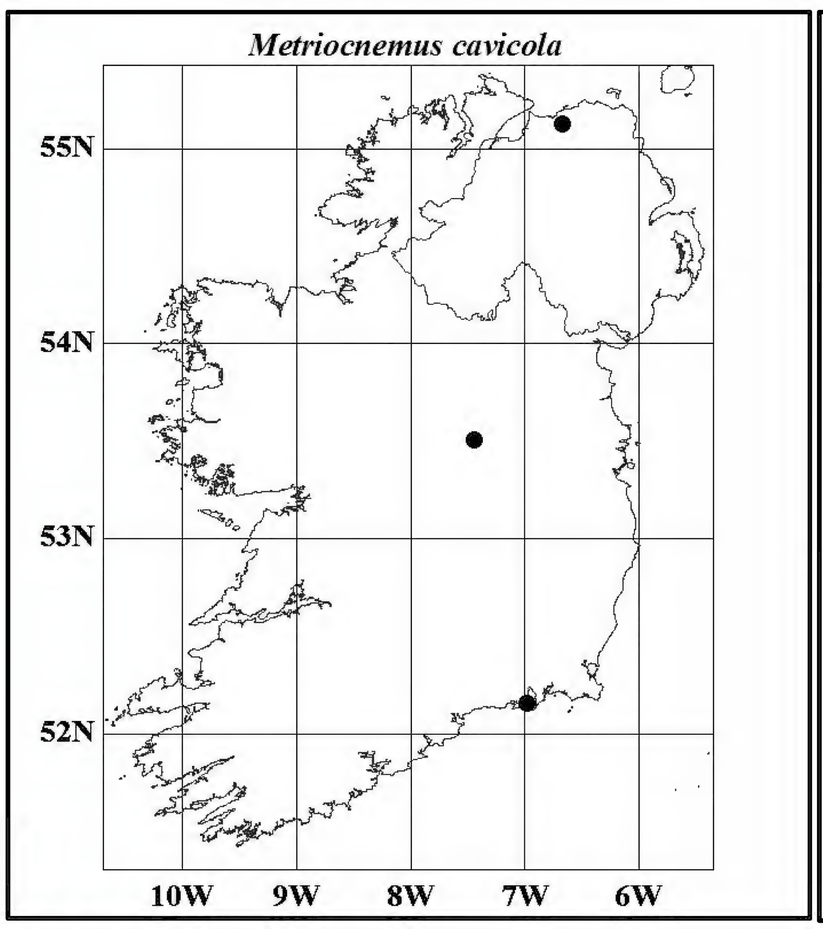


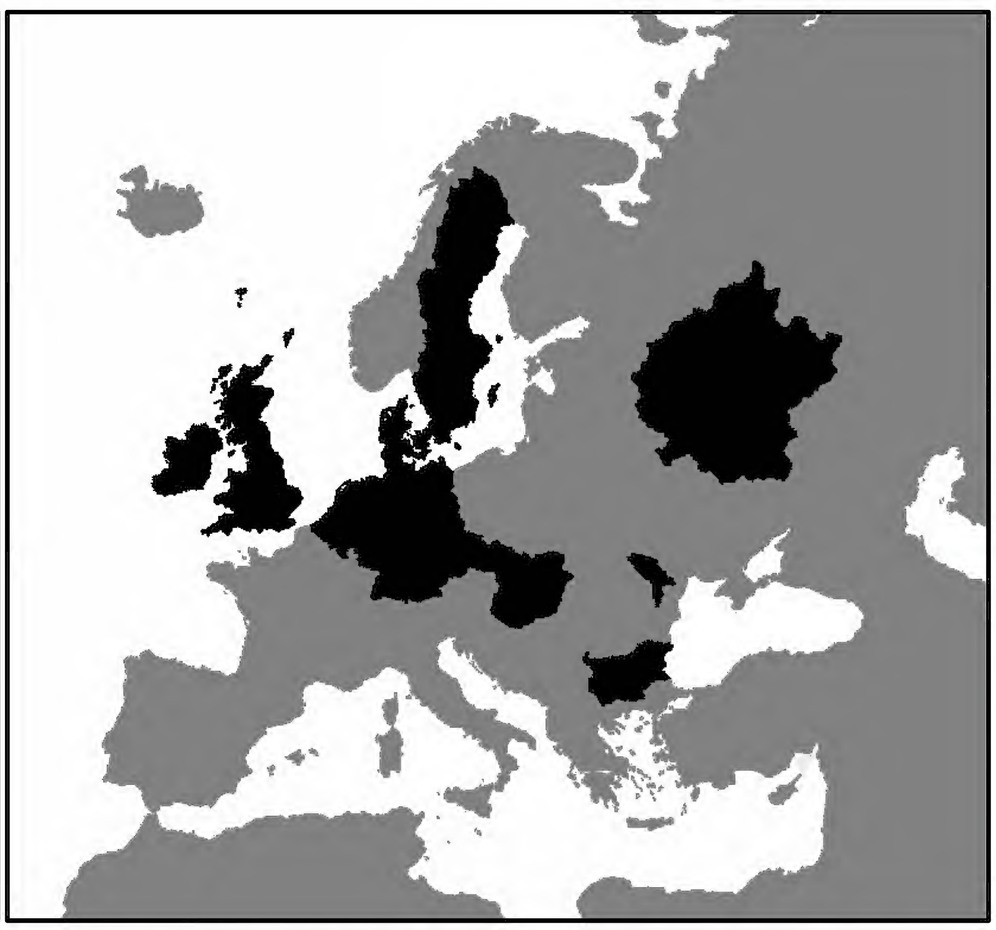
FIGURES 389-390. *Metriocnemus atriclava* Kieffer, 1921.



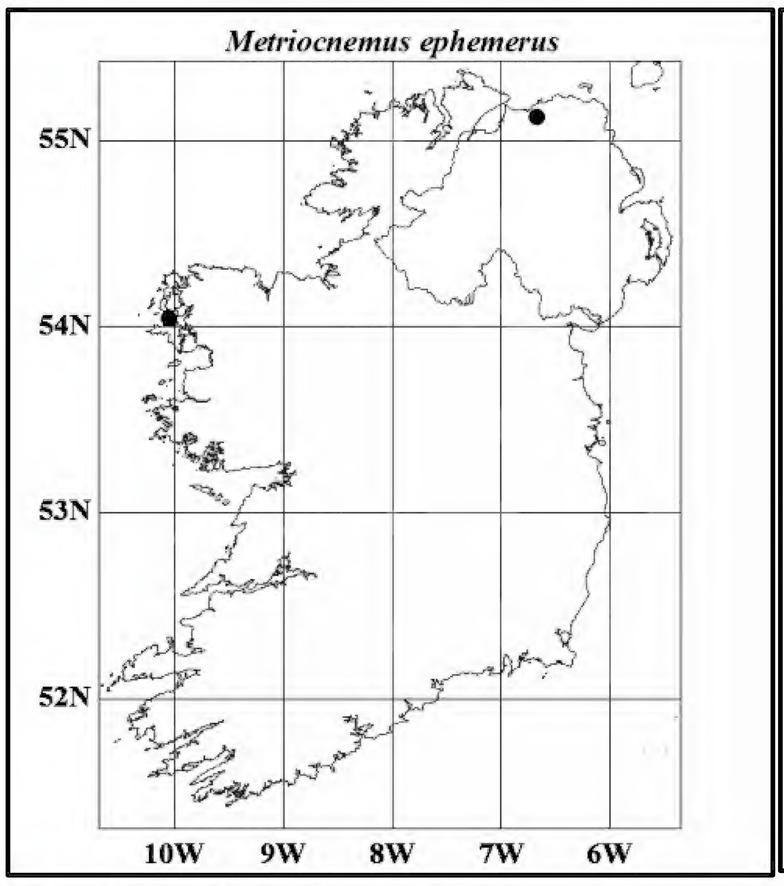


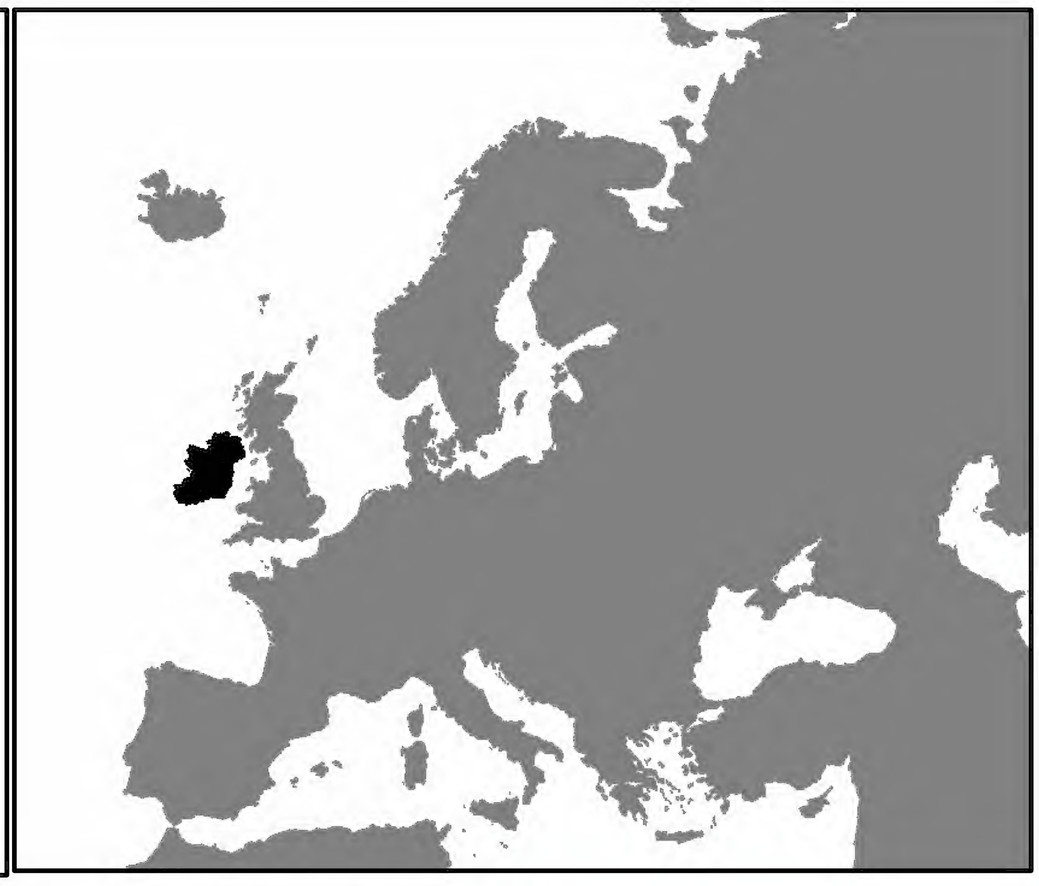
FIGURES 391-392. *Metriocnemus beringensis* (Cranston & Oliver, 1988).



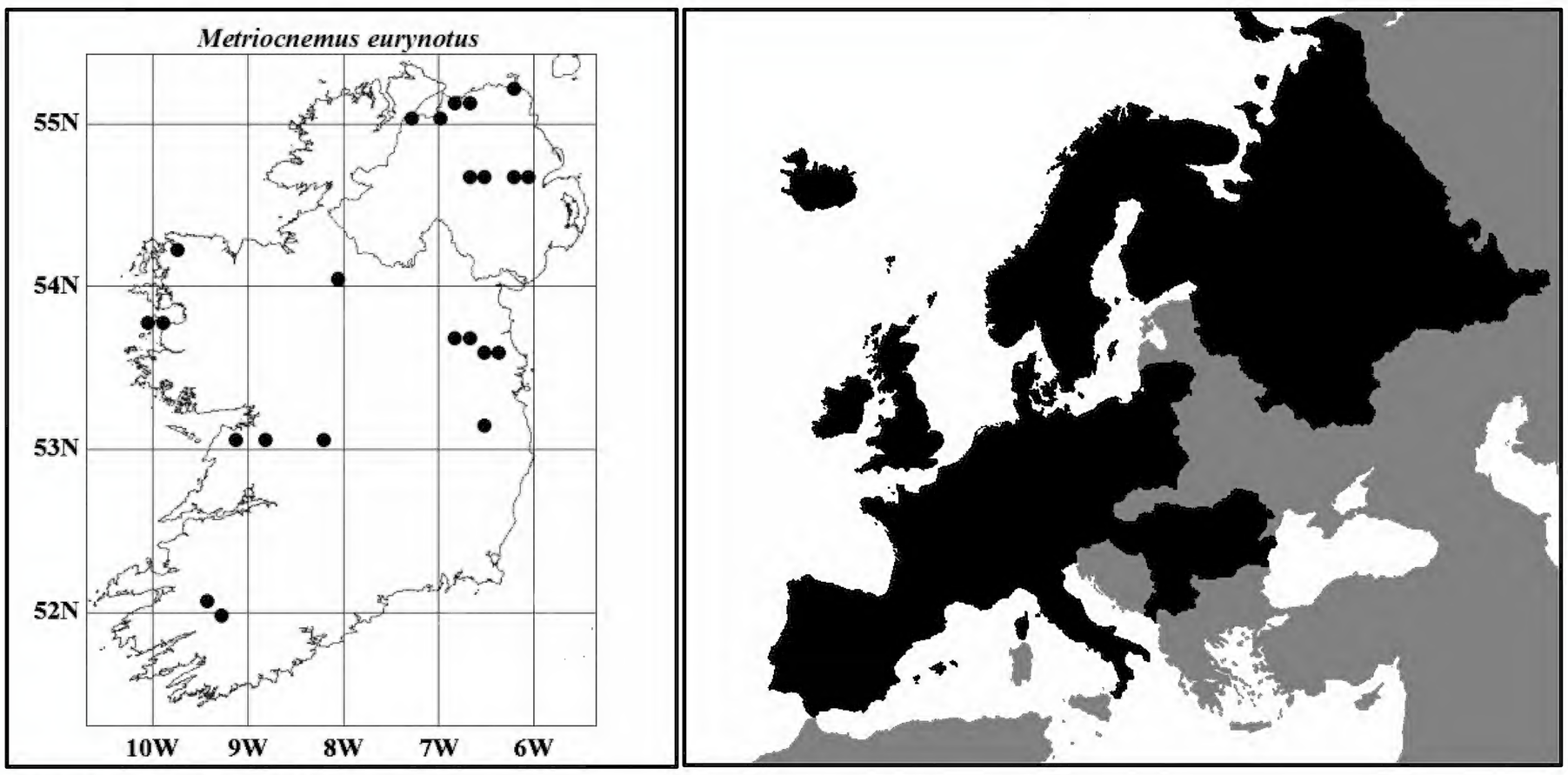


FIGURES 393-394. *Metriocnemus cavicola* Kieffer, 1921.

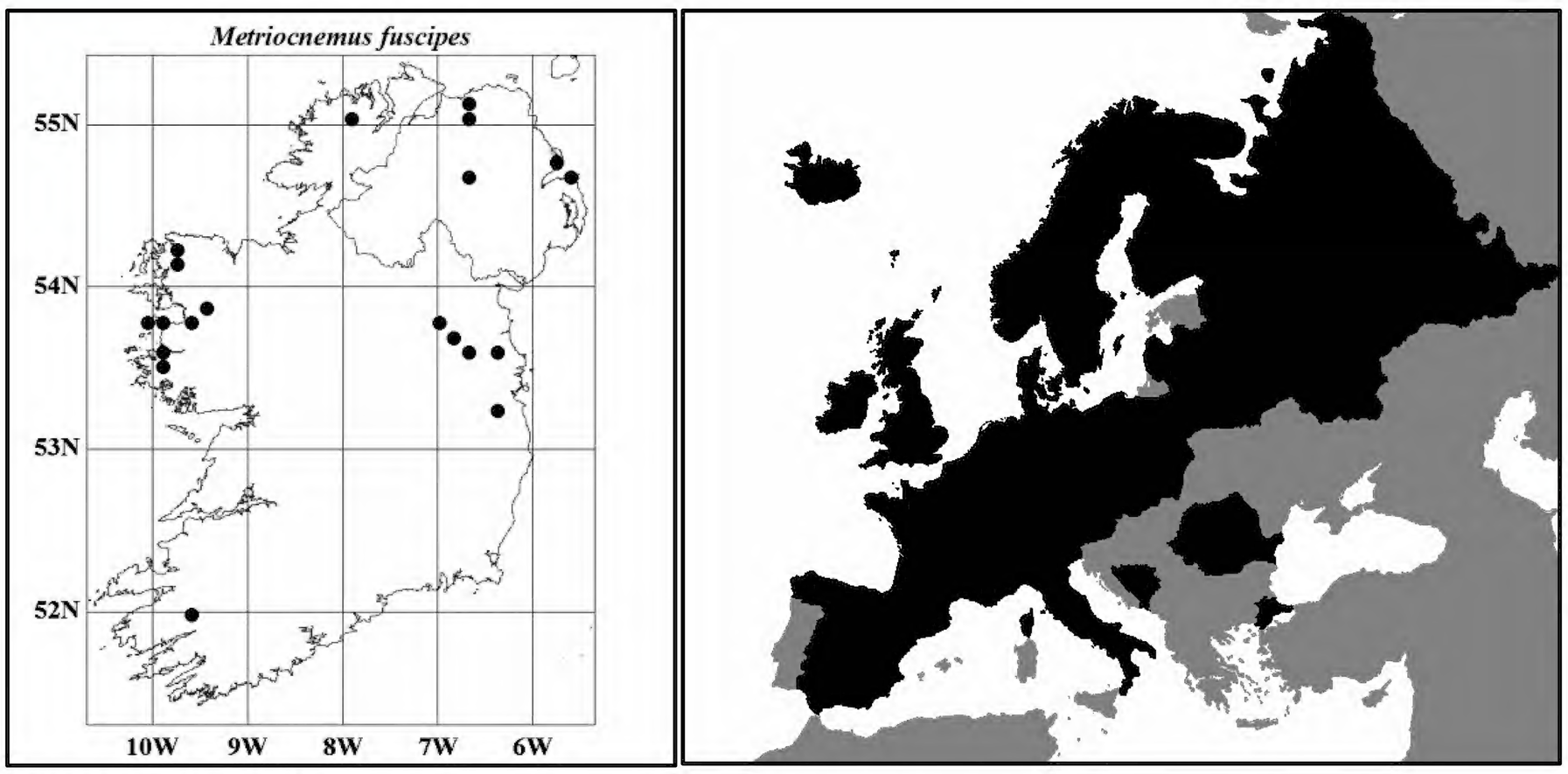




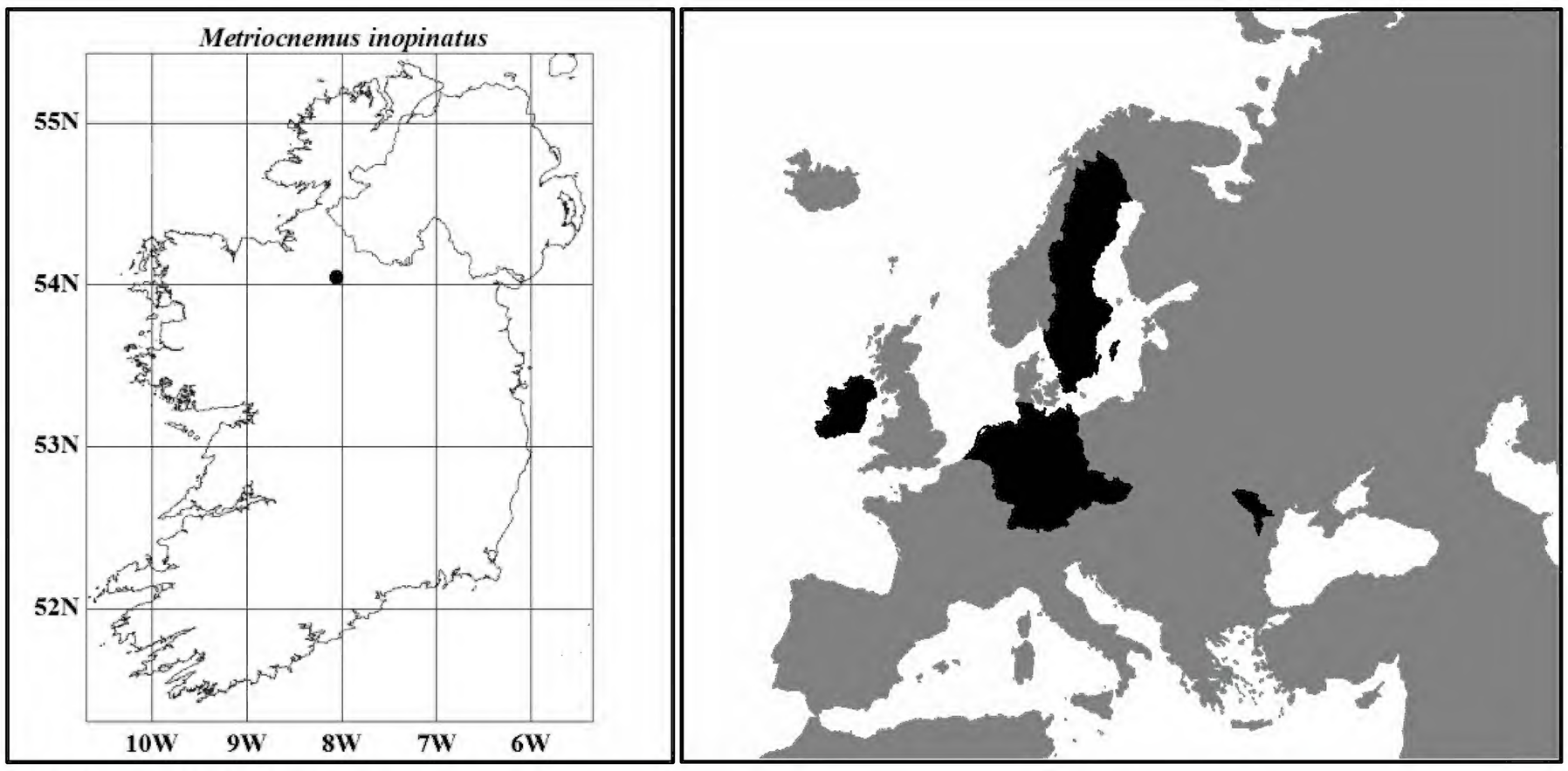
FIGURES 395-396. *Metriocnemus ephemerus* Langton, 2015.



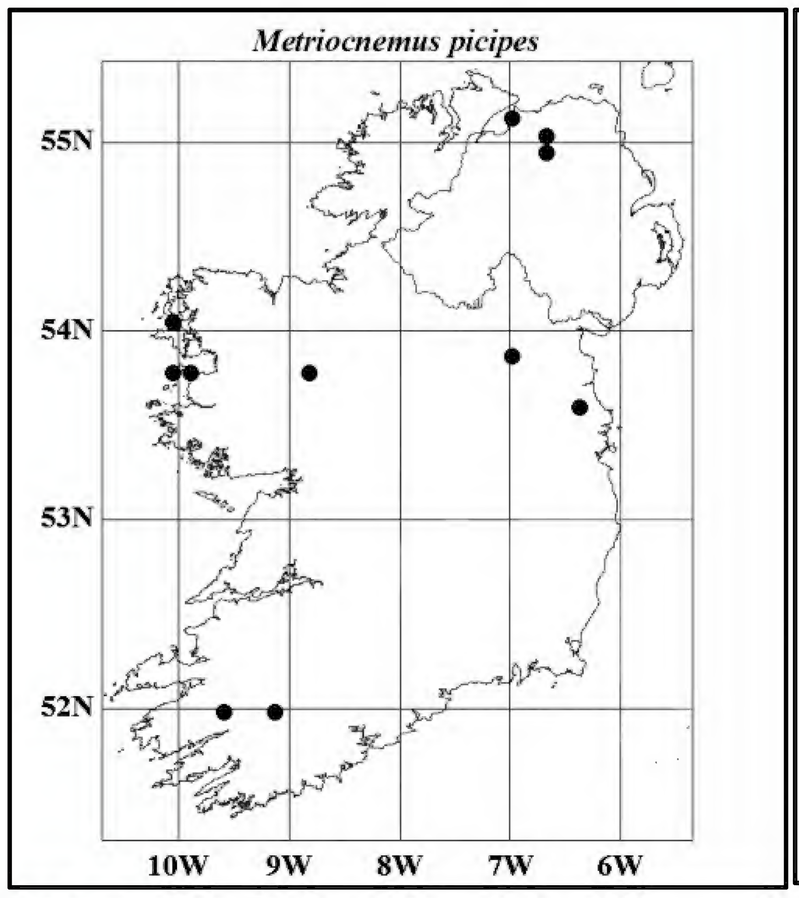
FIGURES 397-398. *Metriocnemus eurynotus* (Holmgren, 1883).

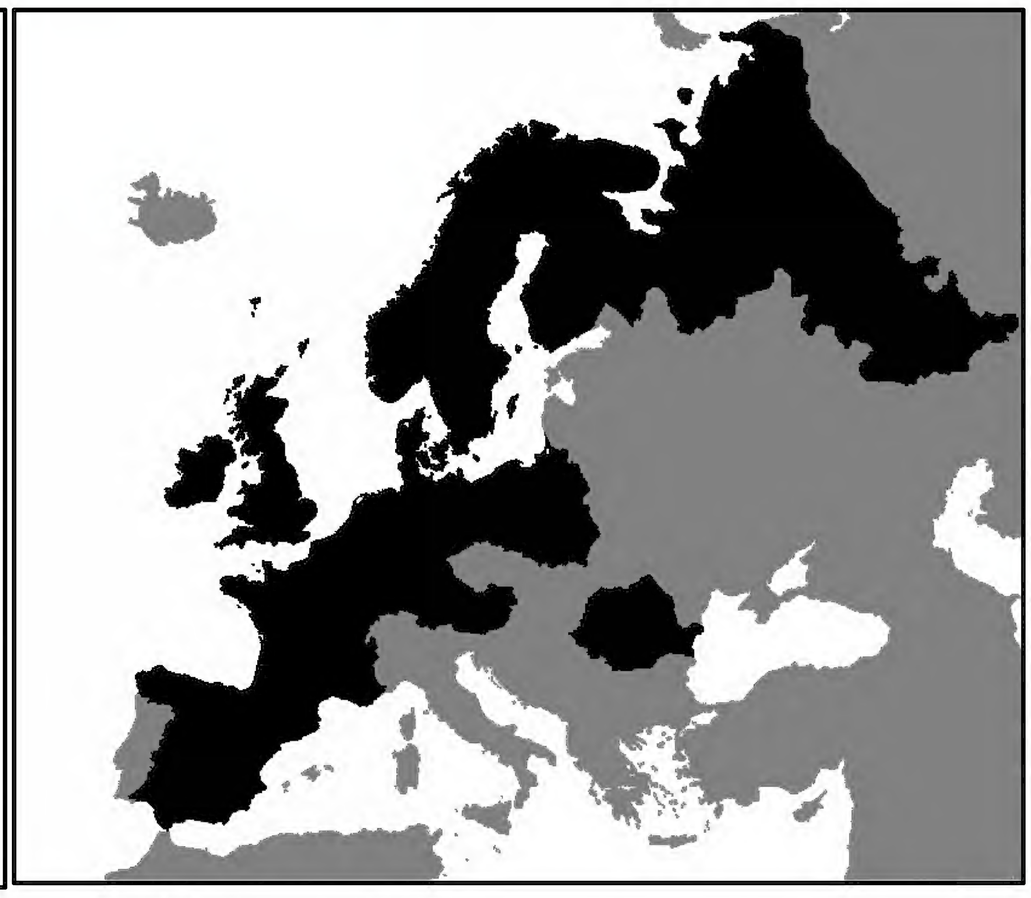


FIGURES 399-400. *Metriocnemus fuscipes* (Meigen, 1818).

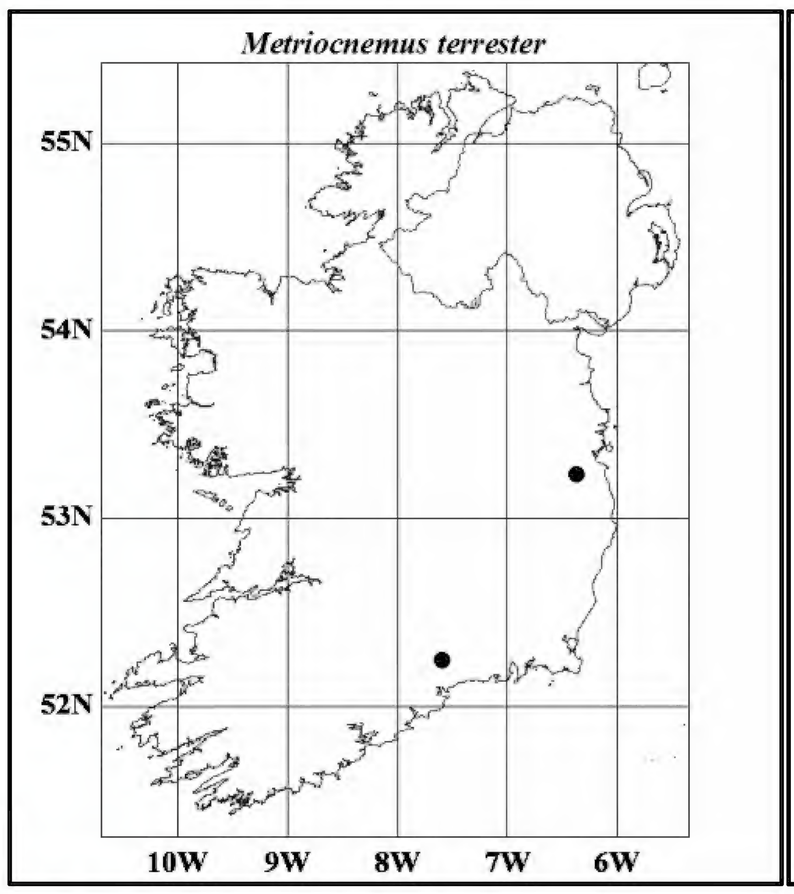


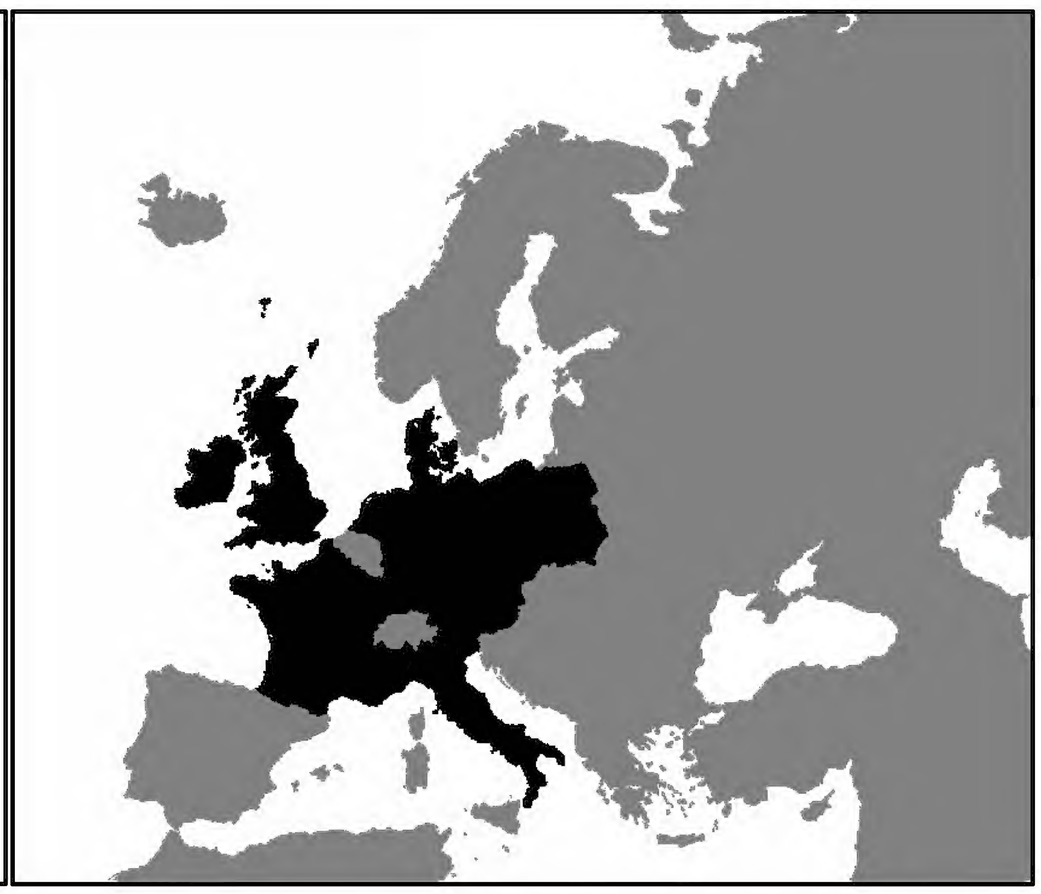
FIGURES 401-402. *Metriocnemus inopinatus* Strenzke, 1950.



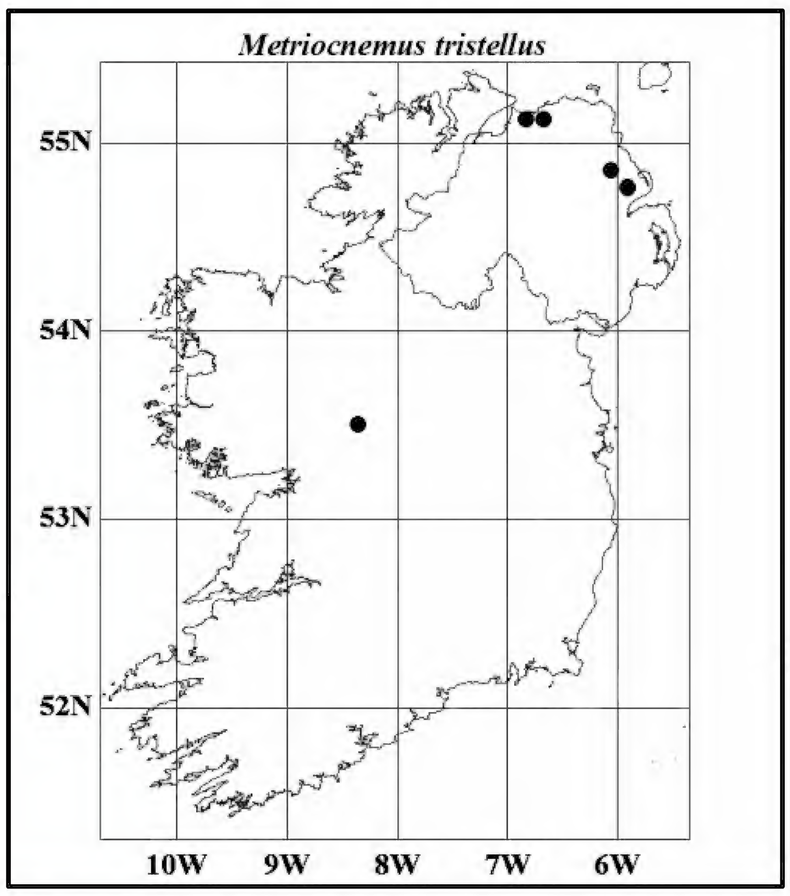


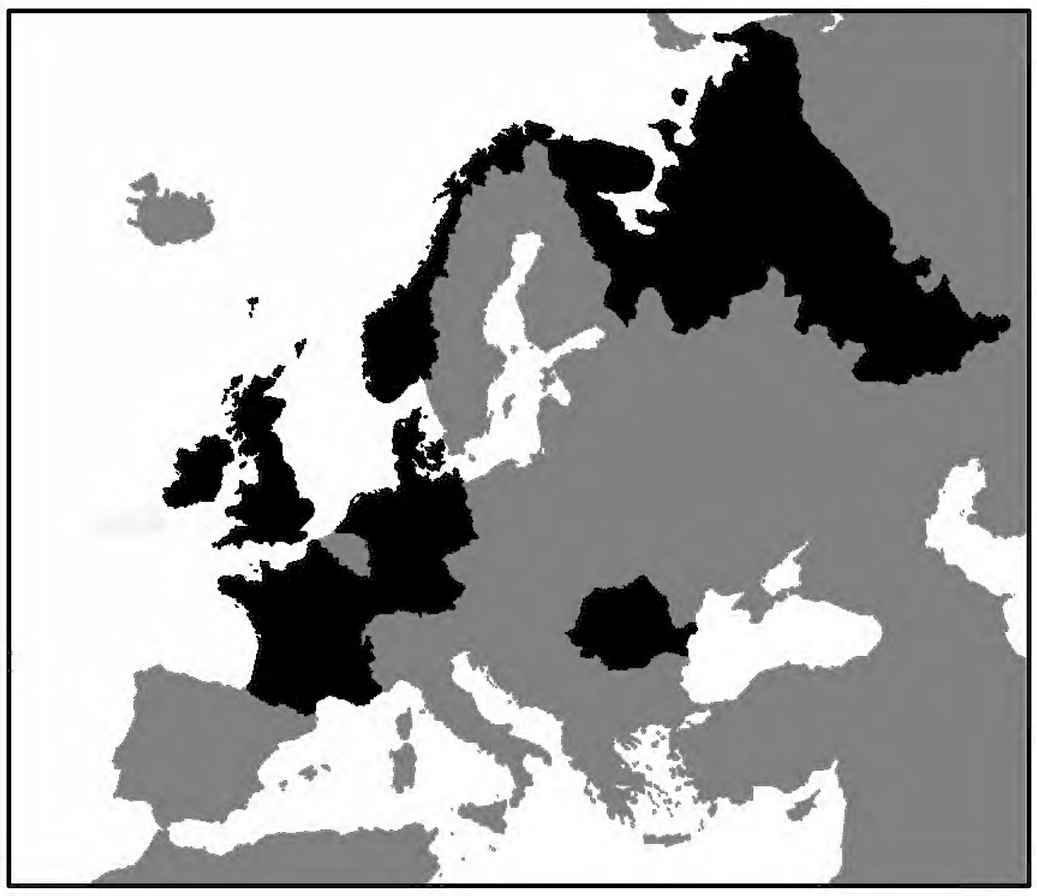
FIGURES 403-404. *Metriocnemus picipes* (Meigen, 1818).



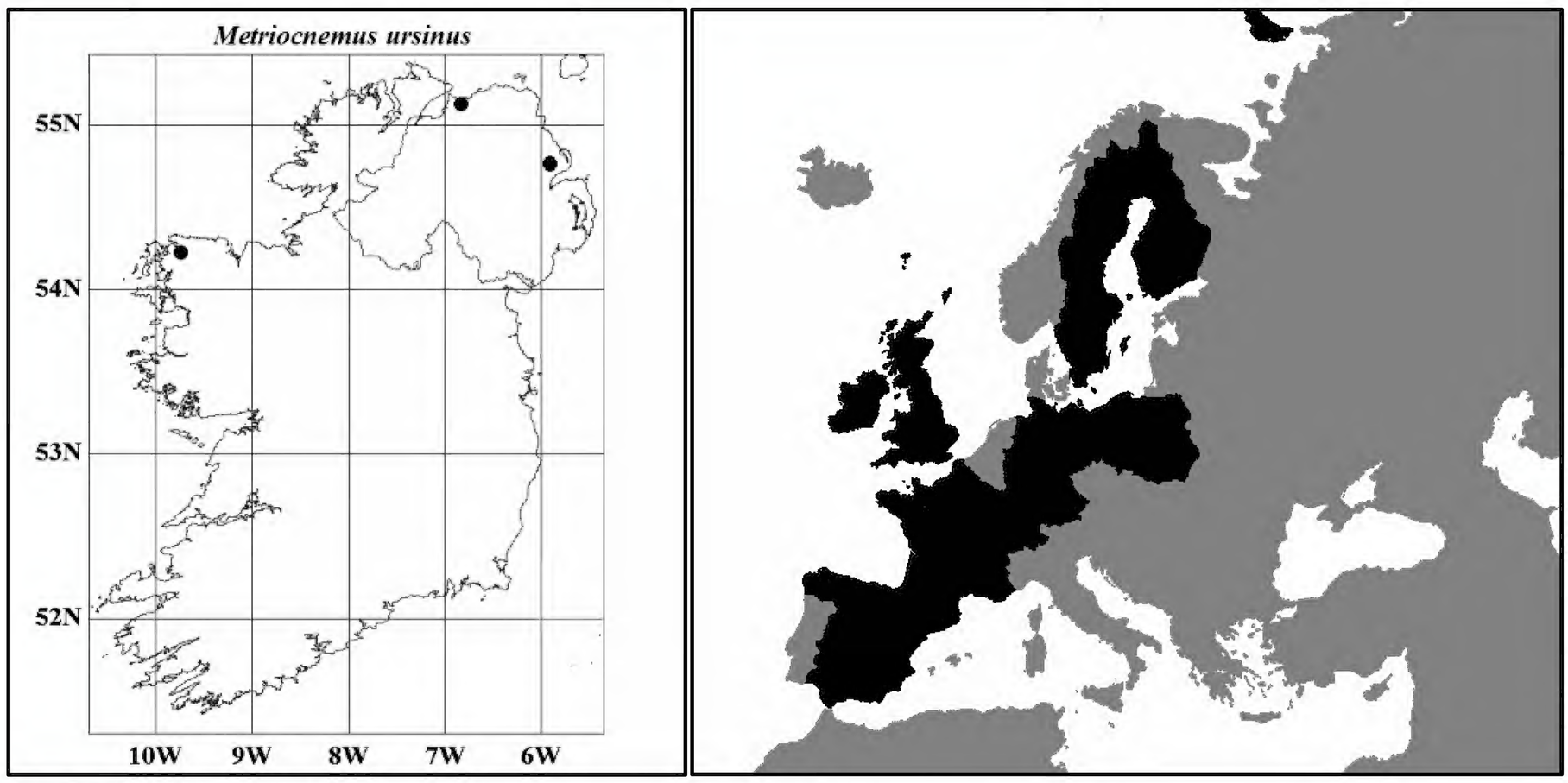


FIGURES 405-406. *Metriocnemus terrester* Pagast, Thienemann & Krüger, 1941.

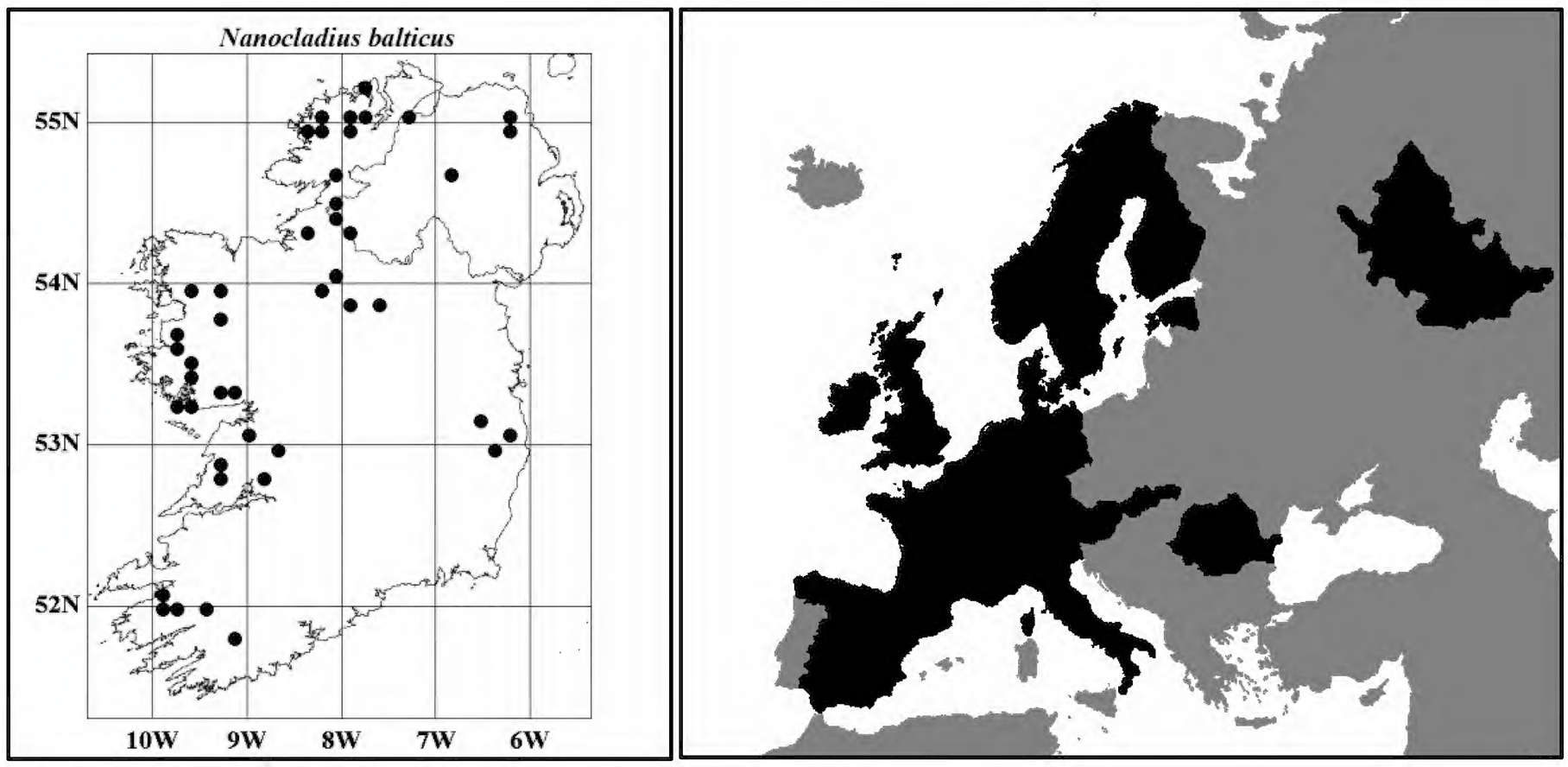




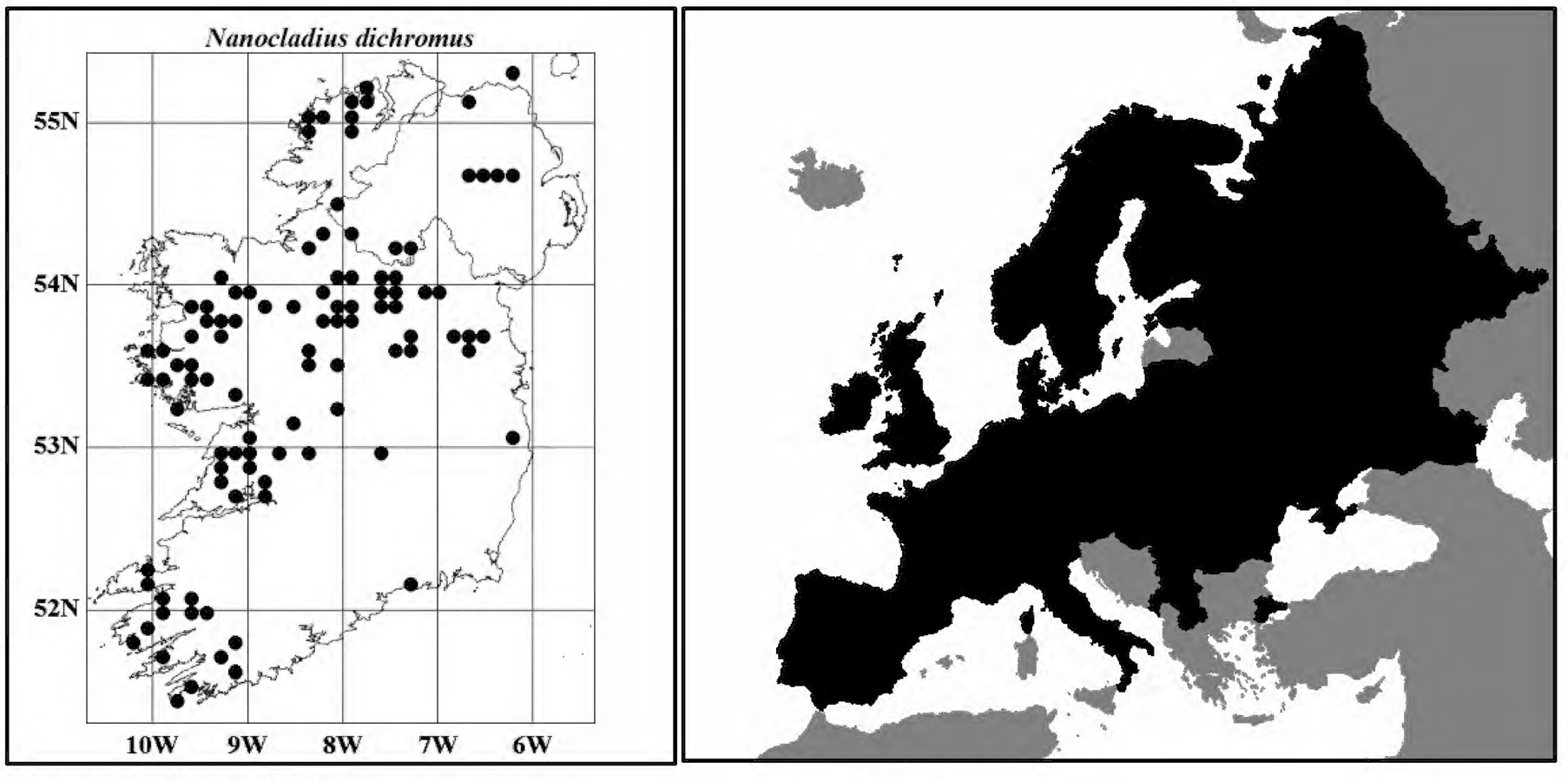
FIGURES 407-408. *Metriocnemus tristellus* Edwards, 1929.



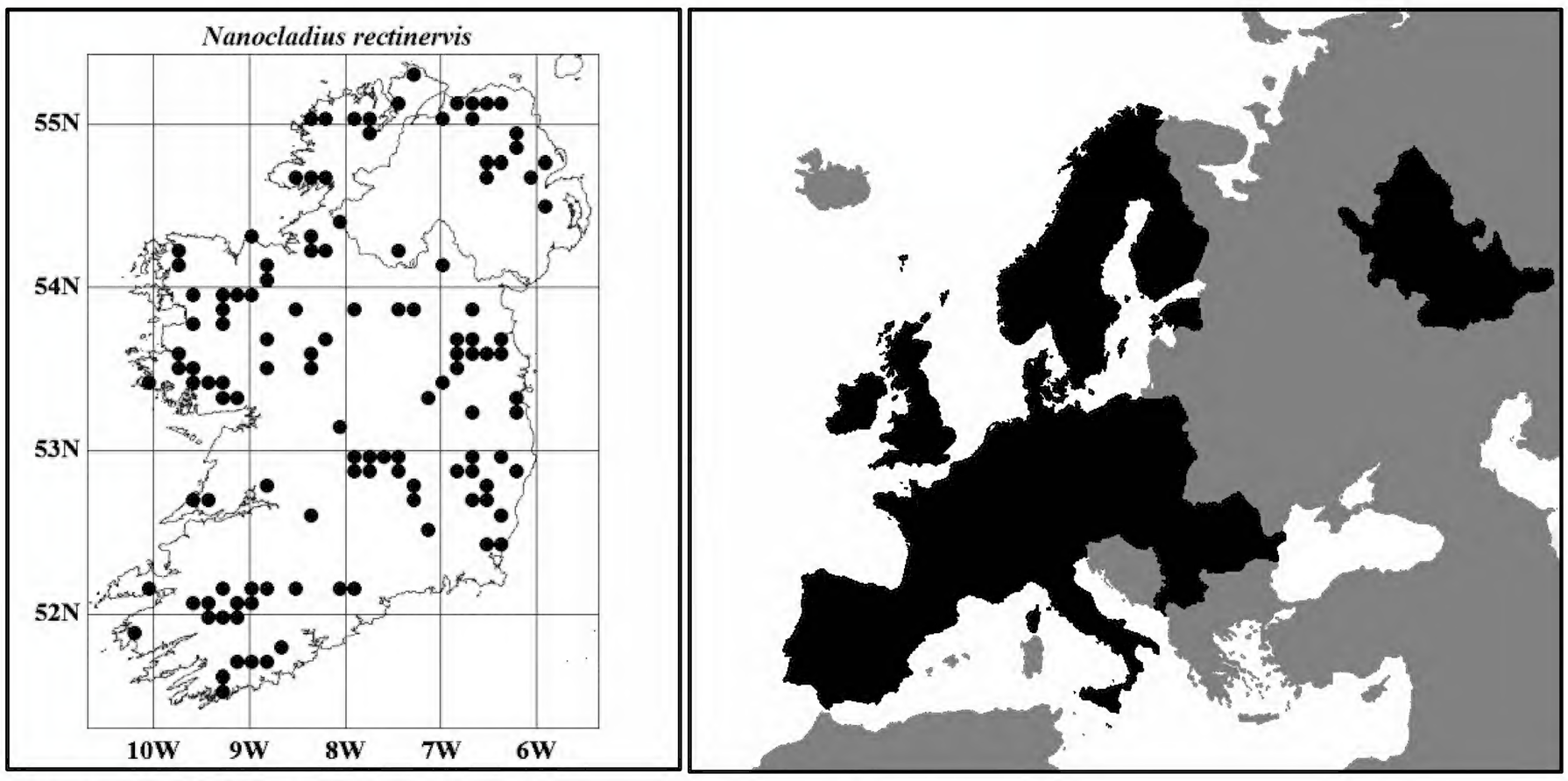
FIGURES 409-410. *Metriocnemus ursinus* (Holmgren, 1869).



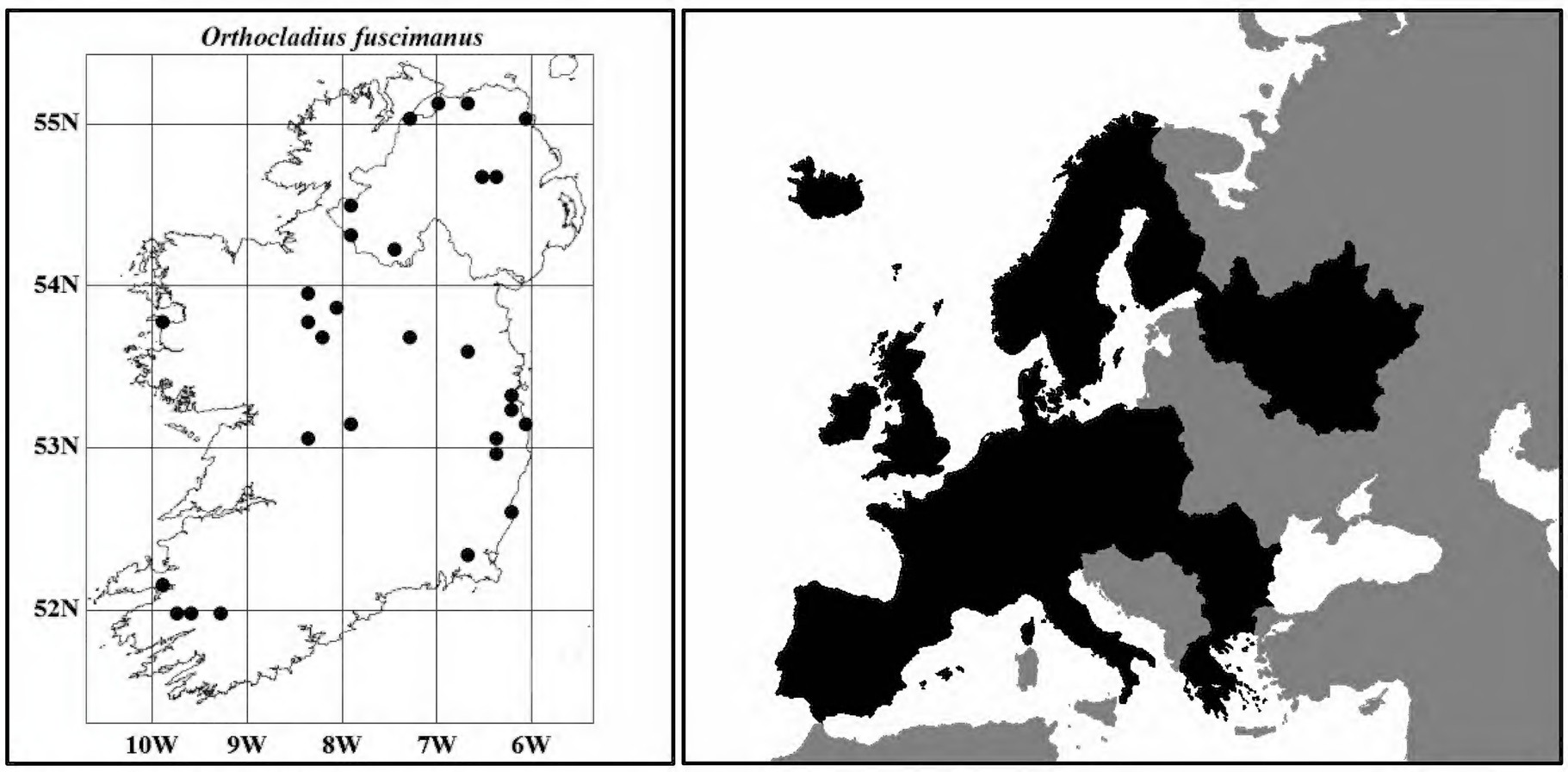
FIGURES 411-412. *Nanocladius balticus* (Palmén, 1959).



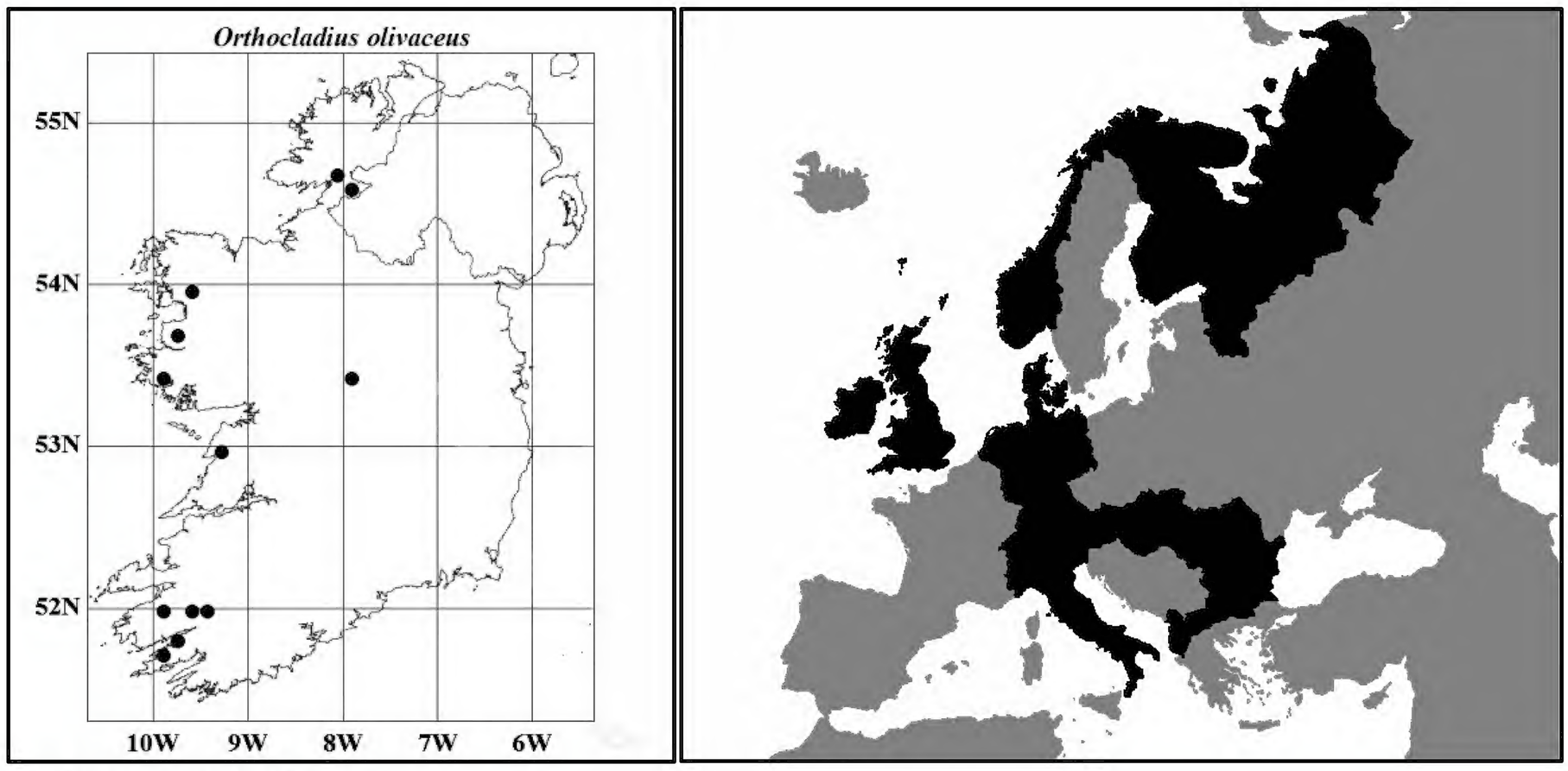
FIGURES 413-414. *Nanocladius dichromus* (Kieffer, 1906).



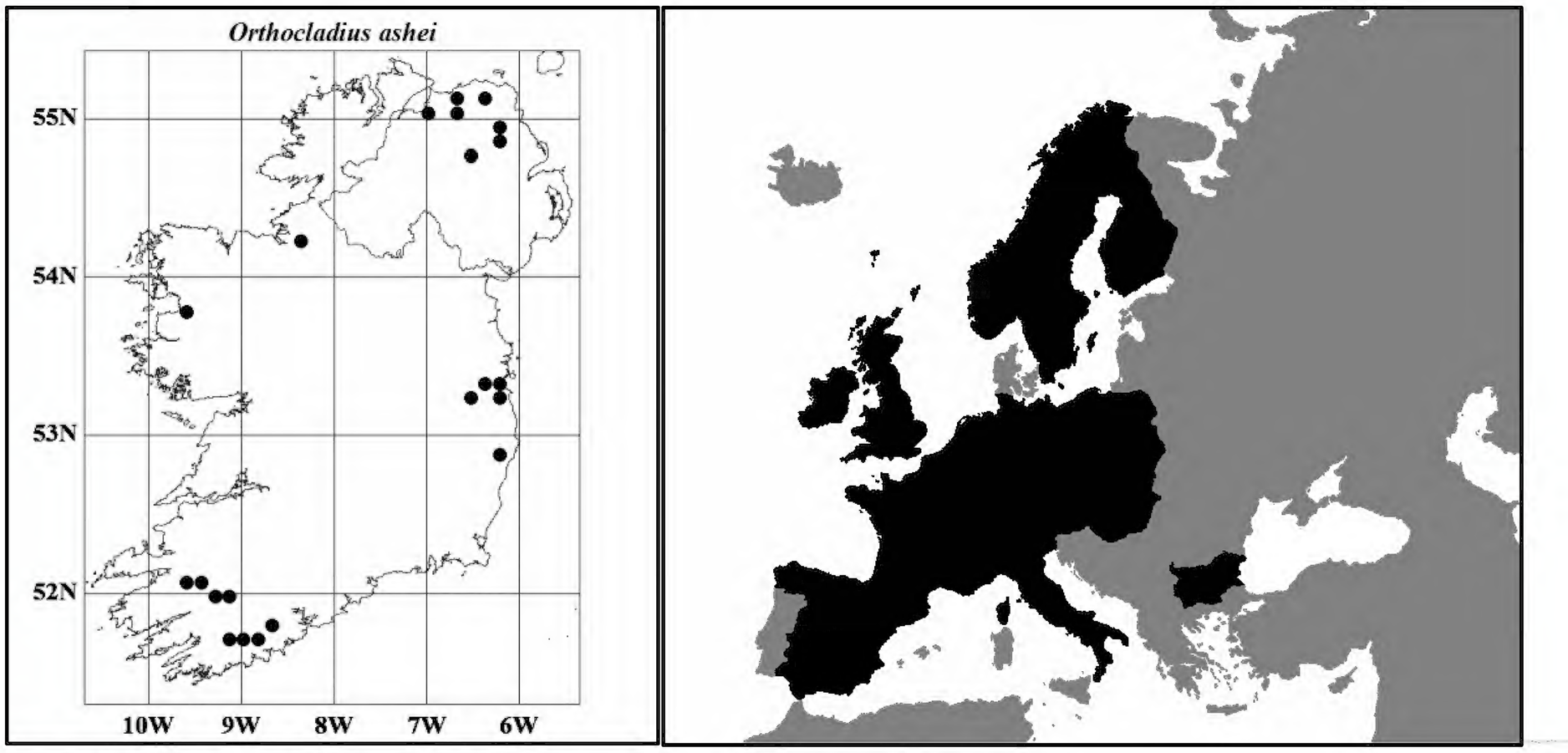
FIGURES 415-416. *Nanocladius rectinervis* (Kieffer, 1911).



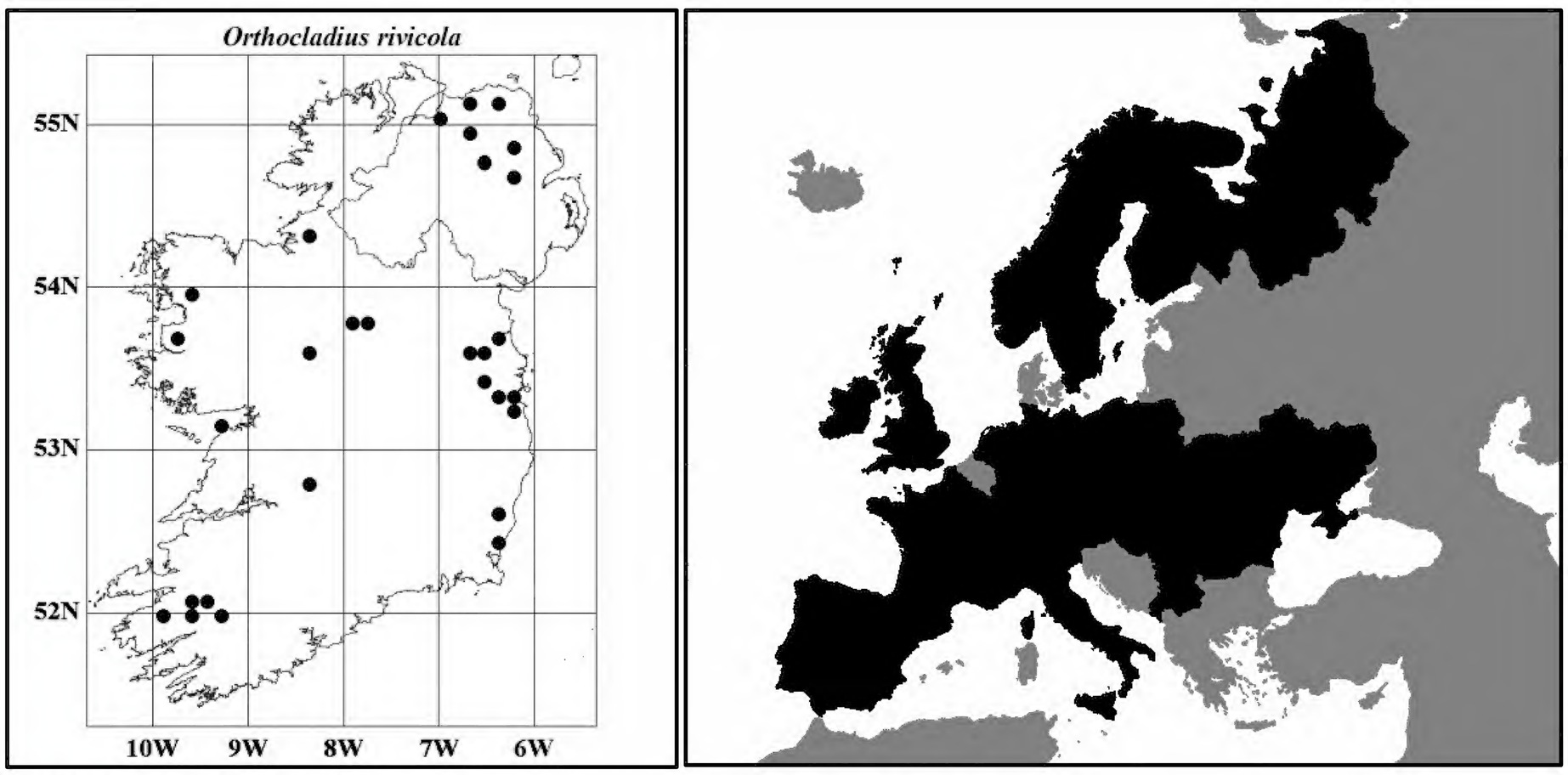
FIGURES 417-418. *Orthocladius fuscimanus* (Kieffer, 1908).



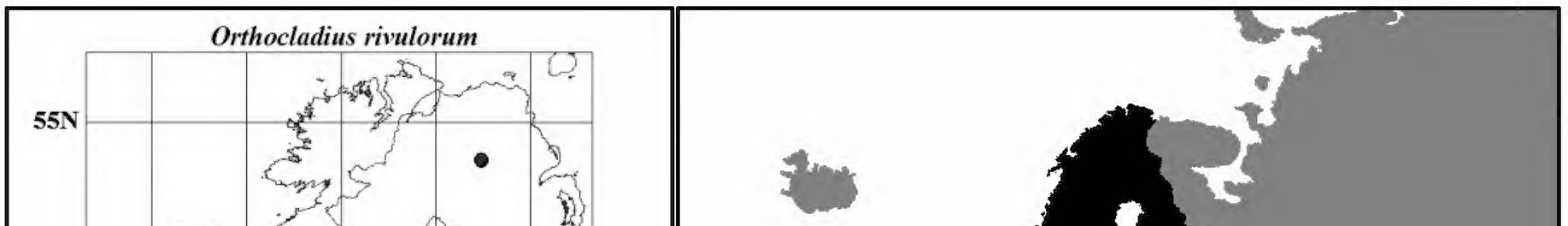
FIGURES 419-420. *Orthocladius olivaceus* (Kieffer, 1911).



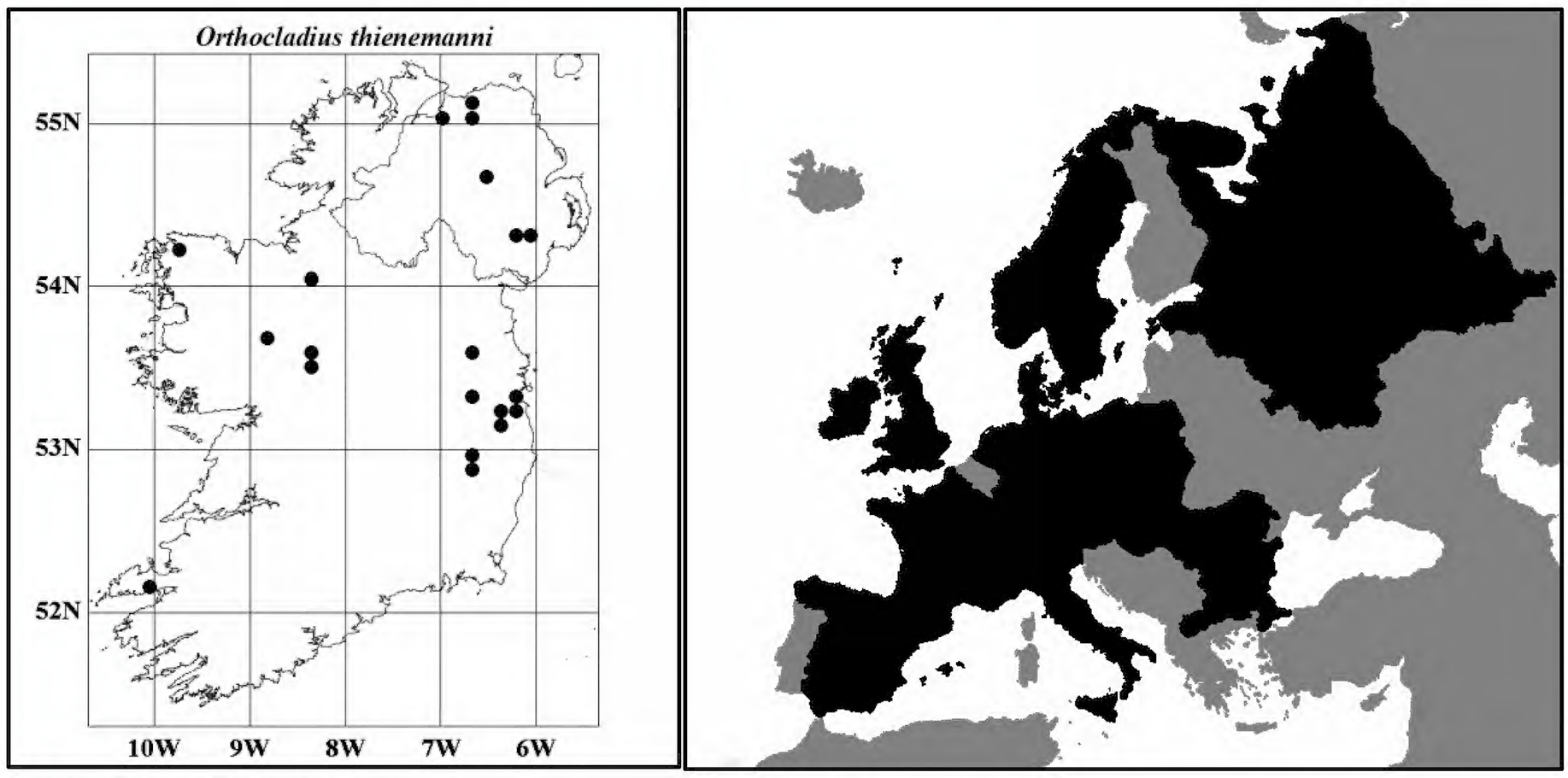
FIGURES 421-422. *Orthocladius ashei* Soponis, 1990.



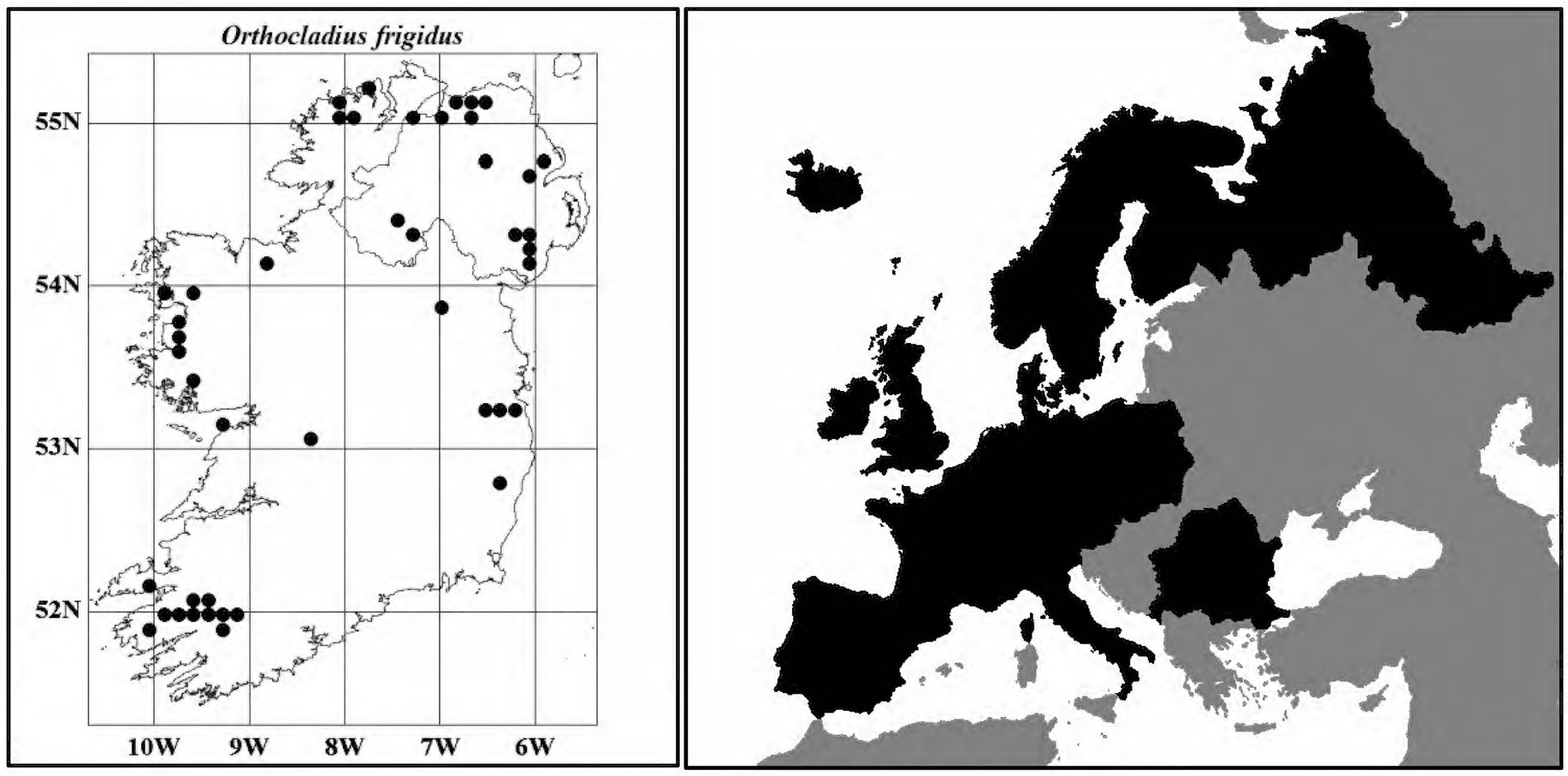
FIGURES 423-424. *Orthocladius rivicola* Kieffer, 1911.



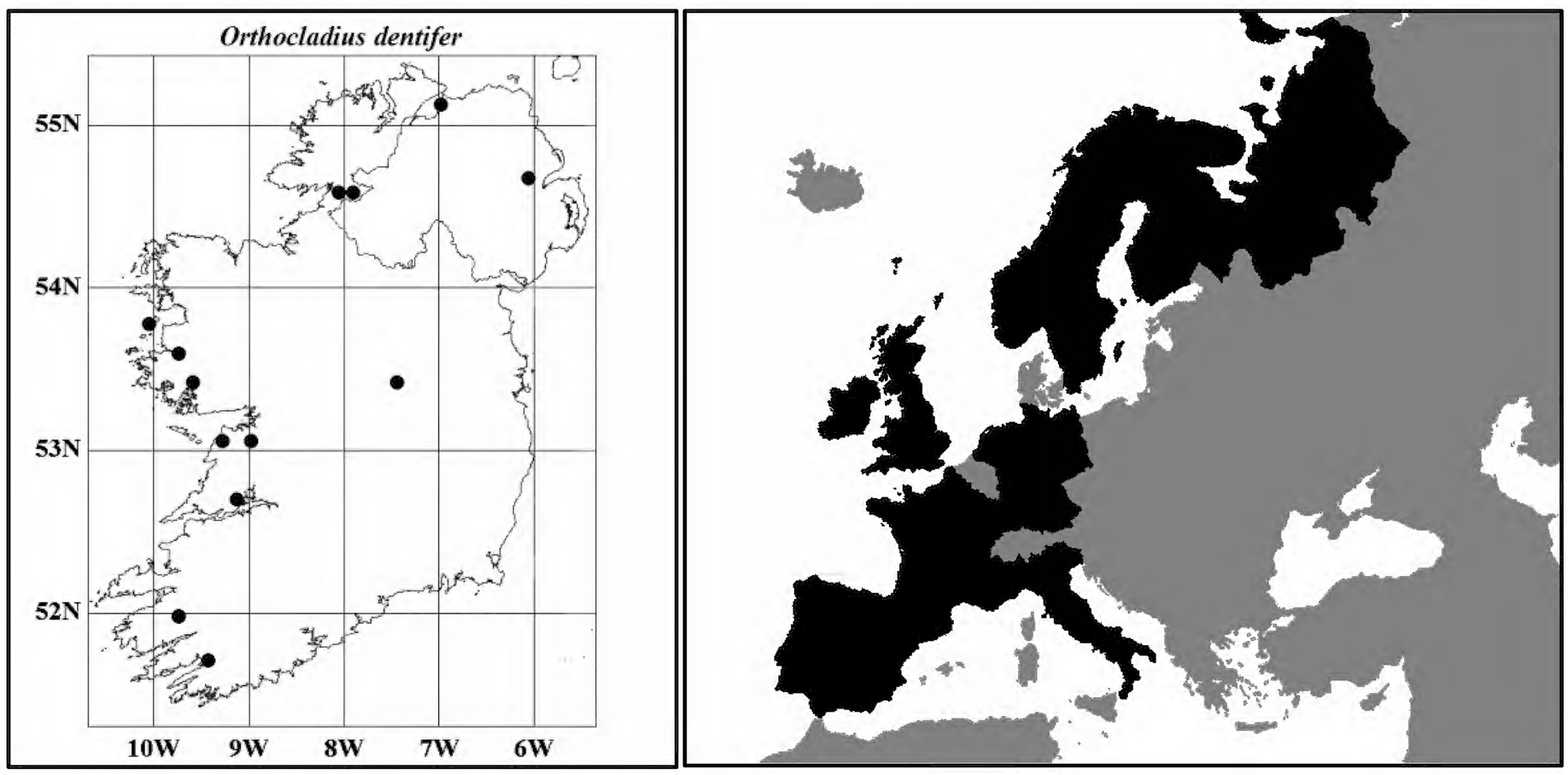
FIGURES 425-426. *Orthocladius rivulorum* Kieffer, 1909.



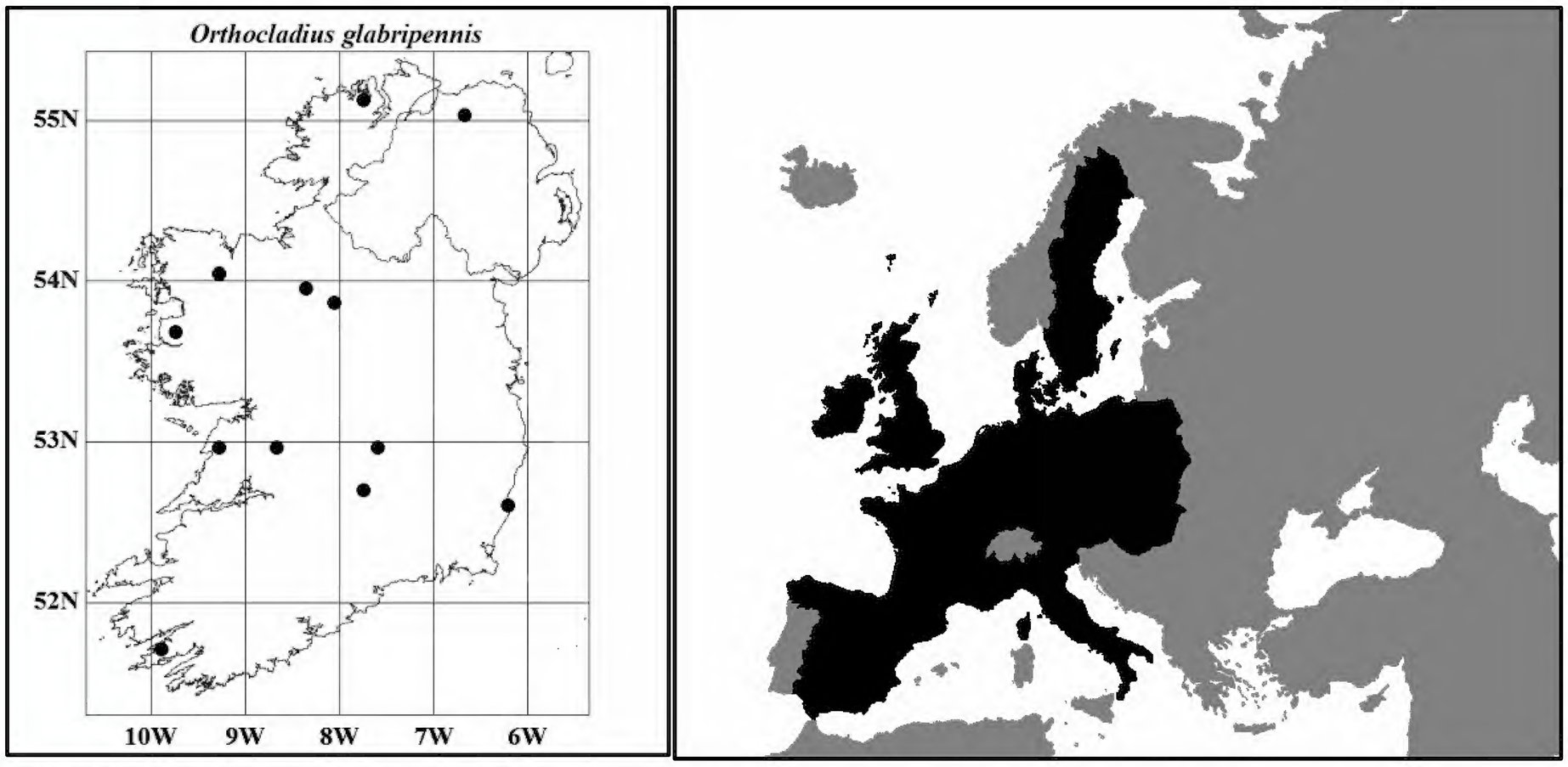
FIGURES 427-428. *Orthocladius thienemanni* Kieffer, 1906.



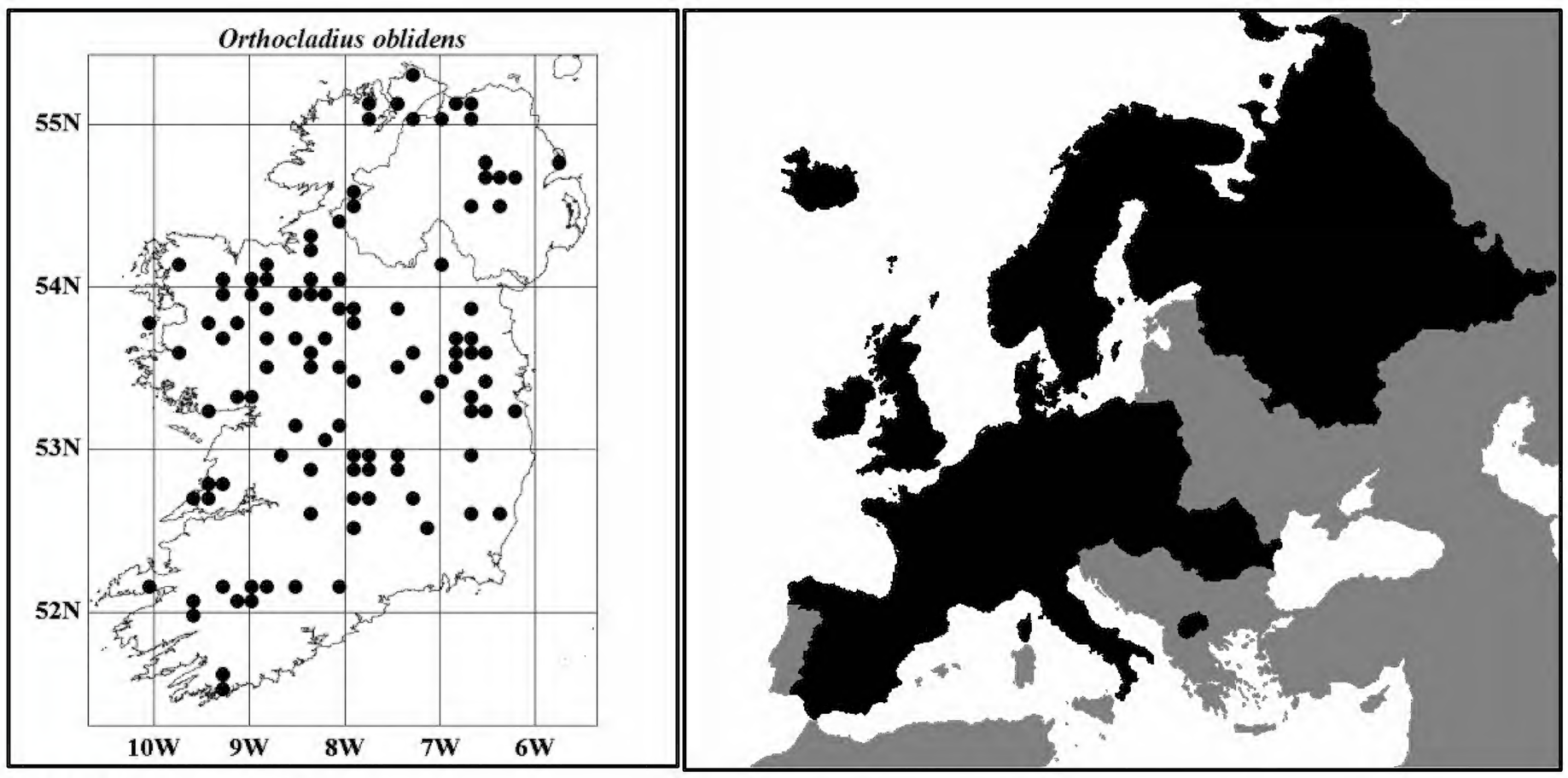
FIGURES 429-430. *Orthocladius frigidus* (Zetterstedt, 1838).



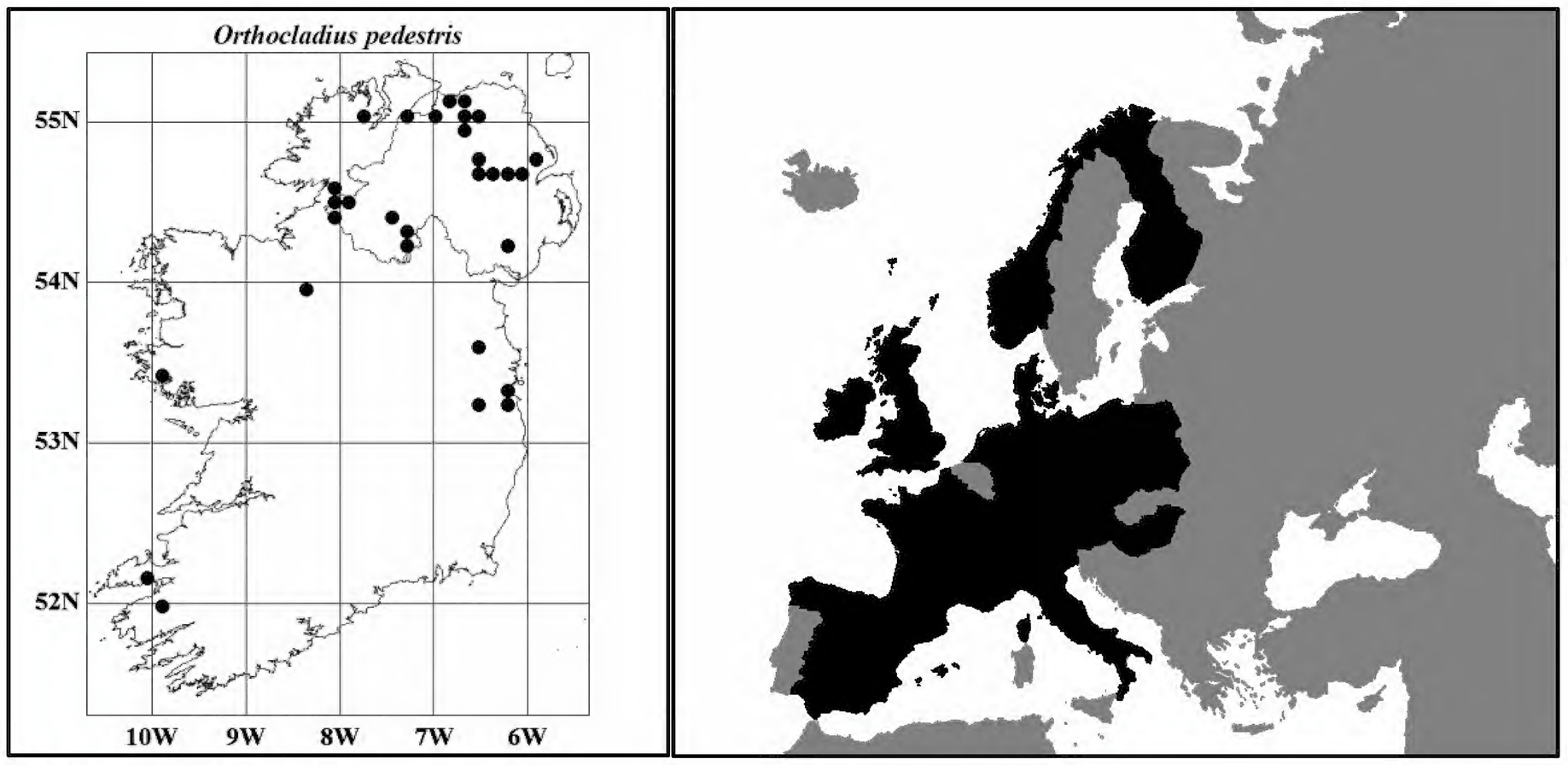
FIGURES 431-432. *Orthocladius dentifer* Brundin, 1947.



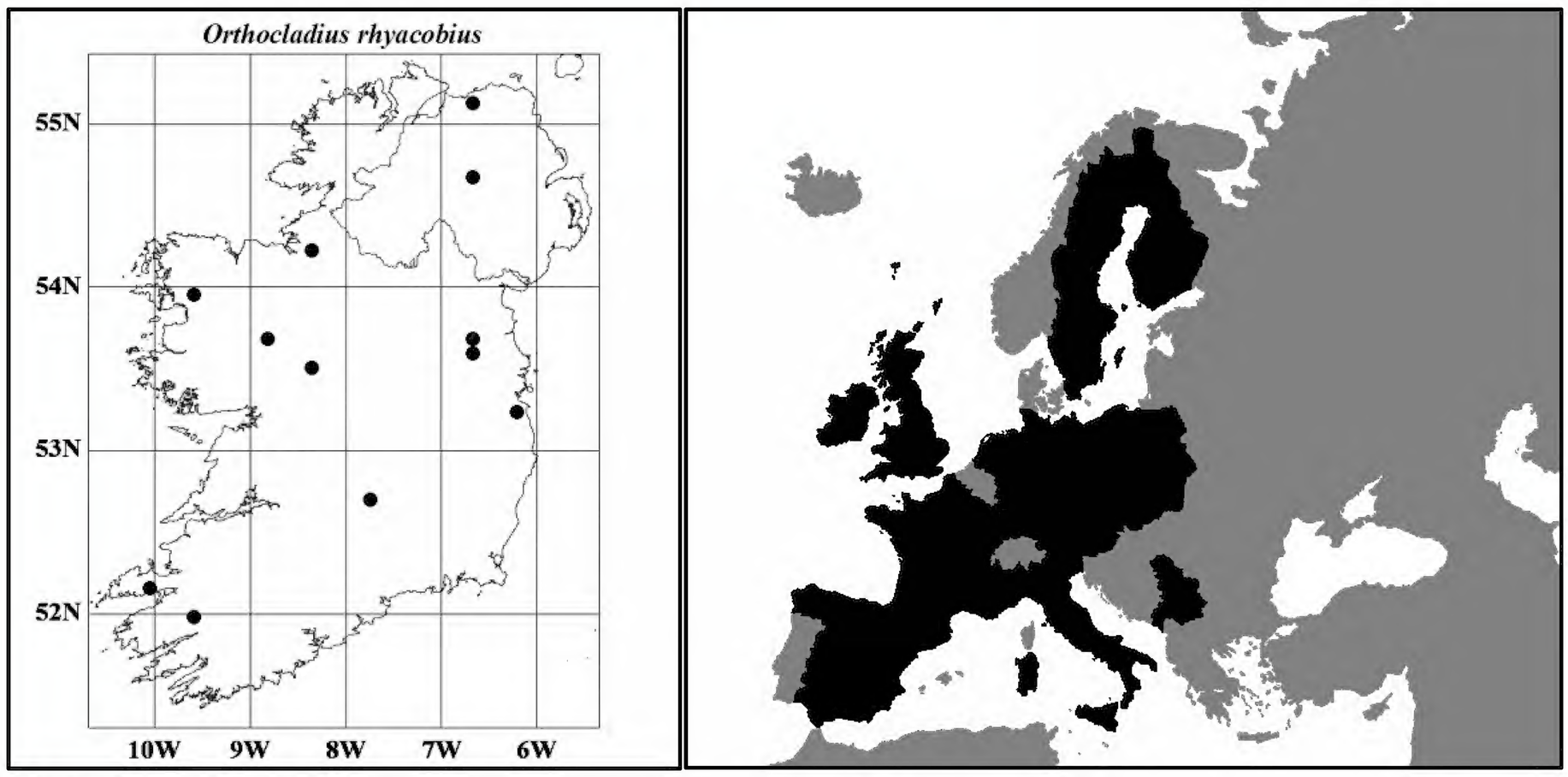
FIGURES 433-434. *Orthocladius glabripennis* (Goetghebuer, 1921).



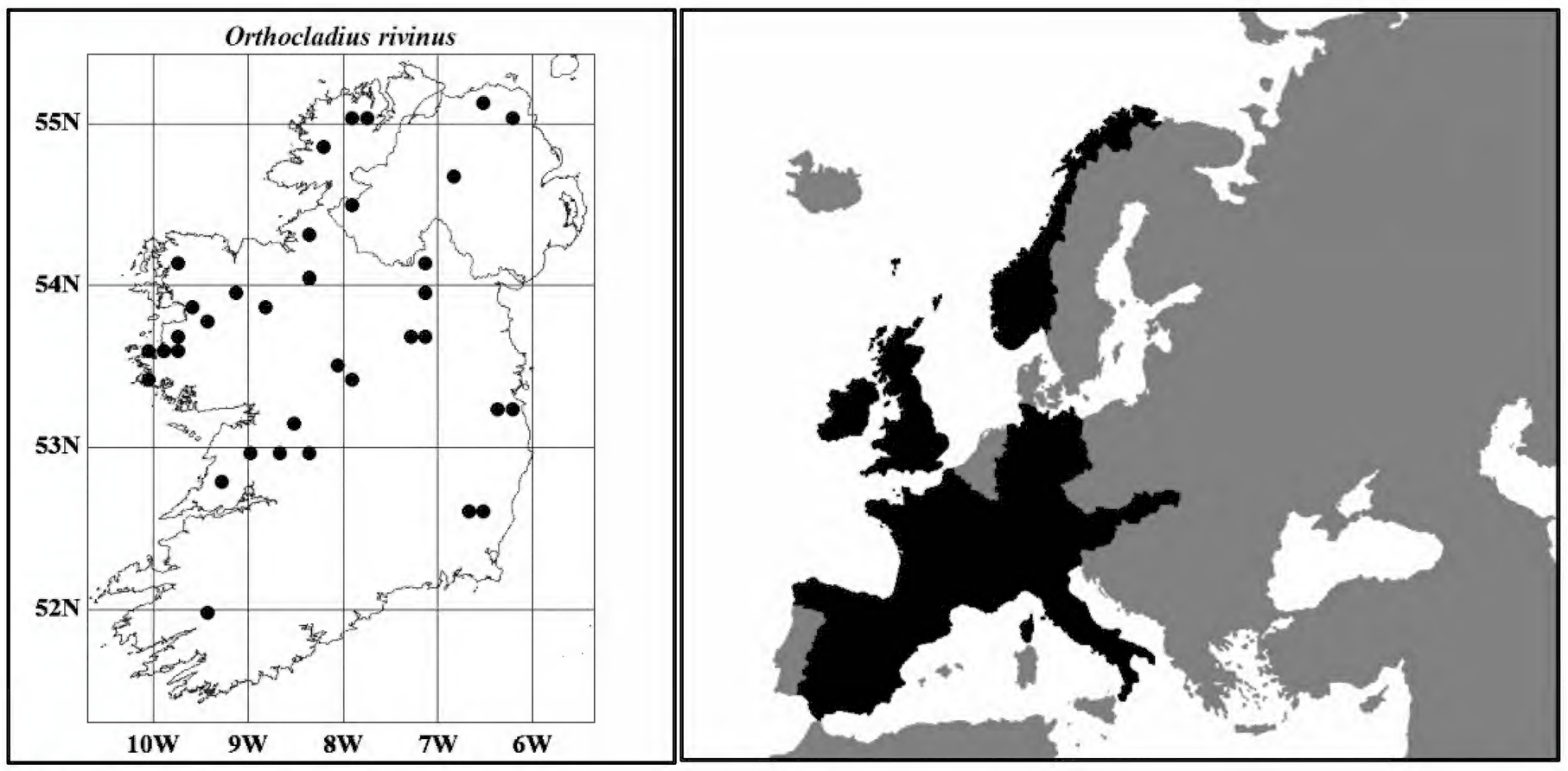
FIGURES 435-436. *Orthocladius oblidens* (Walker, 1856).



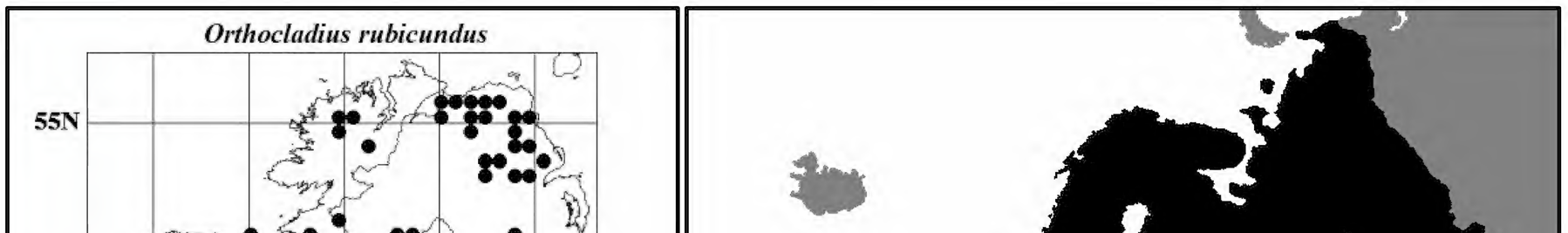
FIGURES 437-438. *Orthocladius pedestris* Kieffer, 1909.



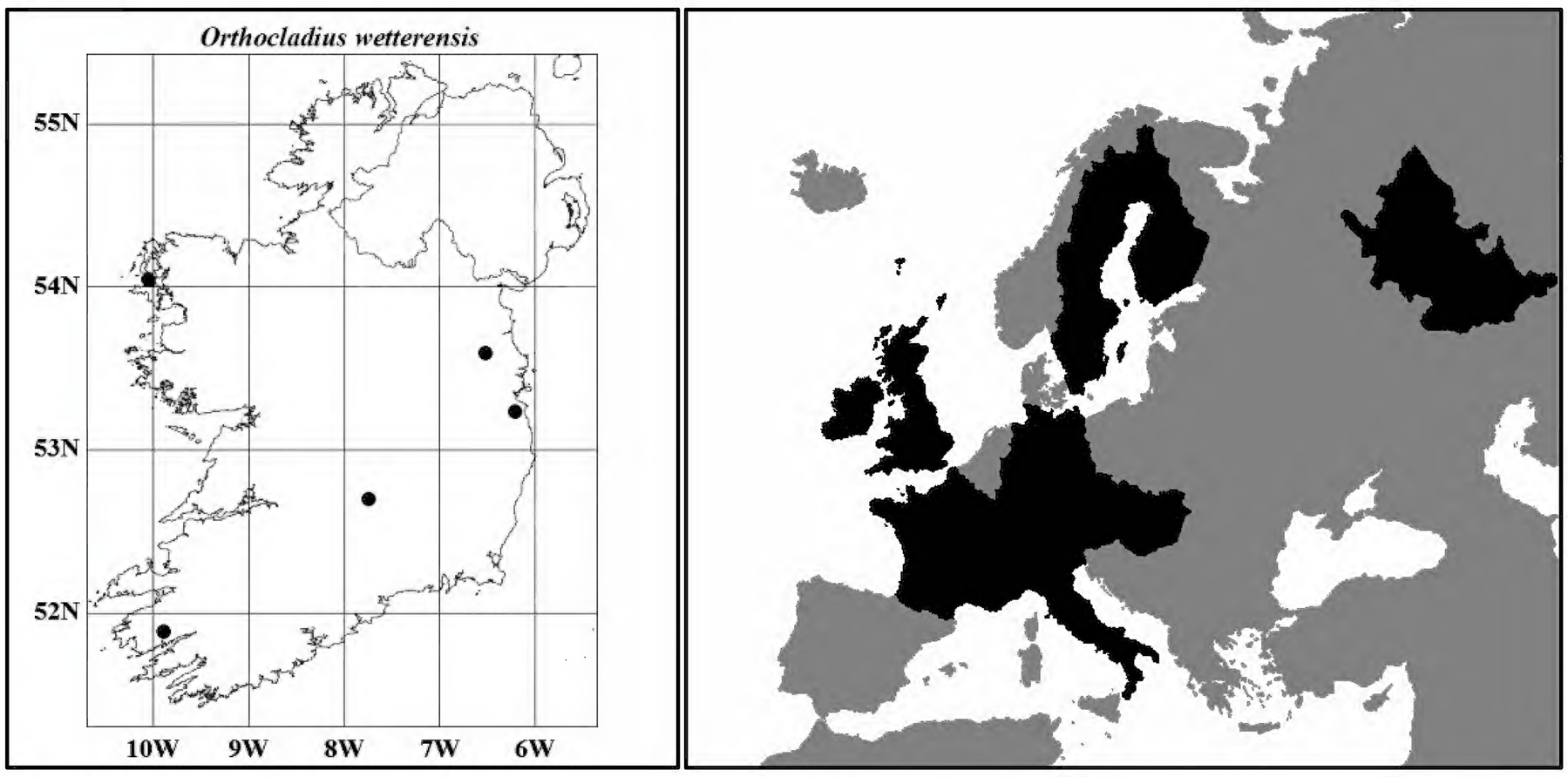
FIGURES 439-440. *Orthocladius rhyacobius* Kieffer, 1911.



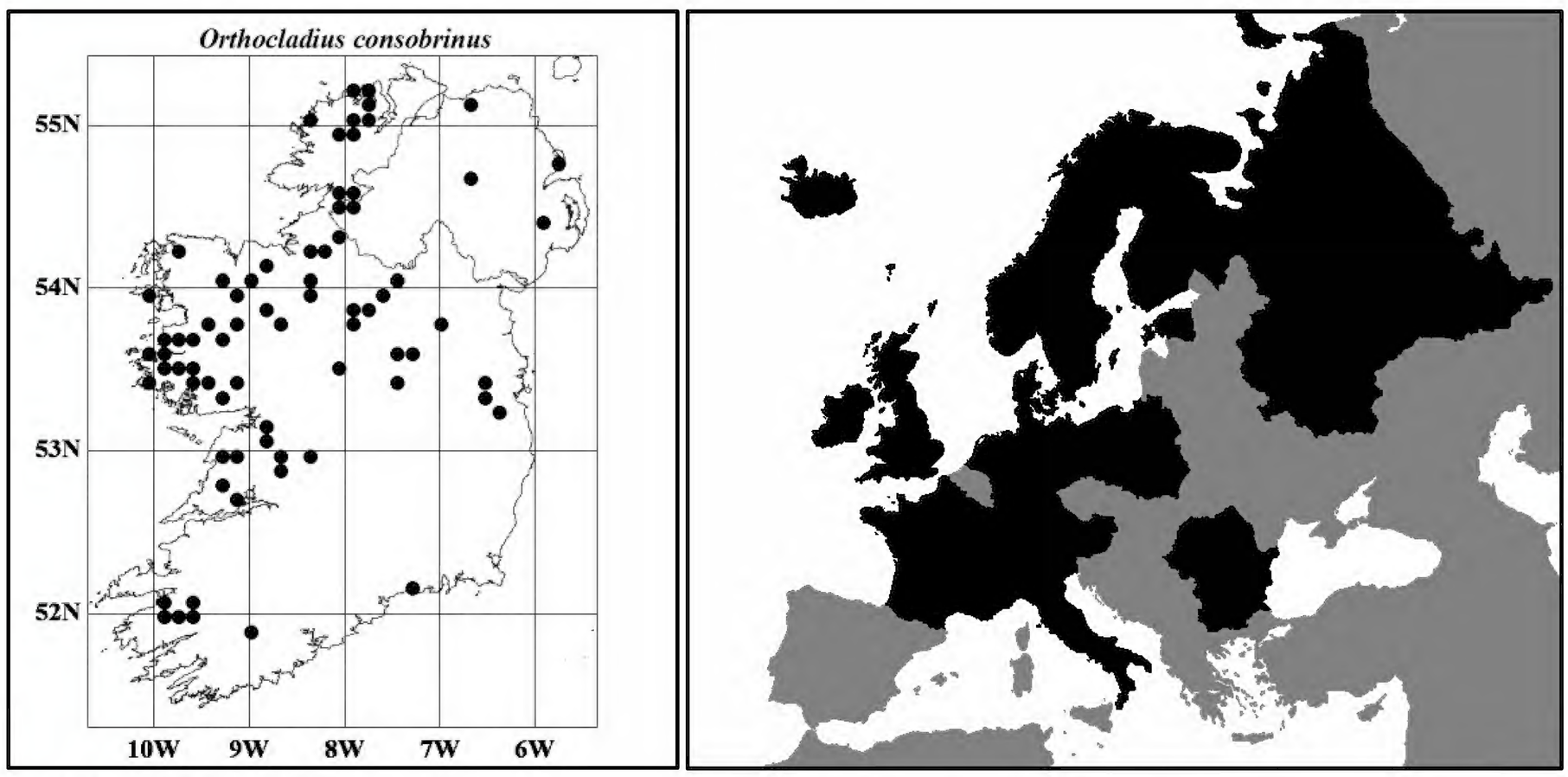
FIGURES 441-442. *Orthocladius rivinus* Potthast, 1914.



FIGURES 443-444. *Orthocladius rubicundus* (Meigen, 1818).

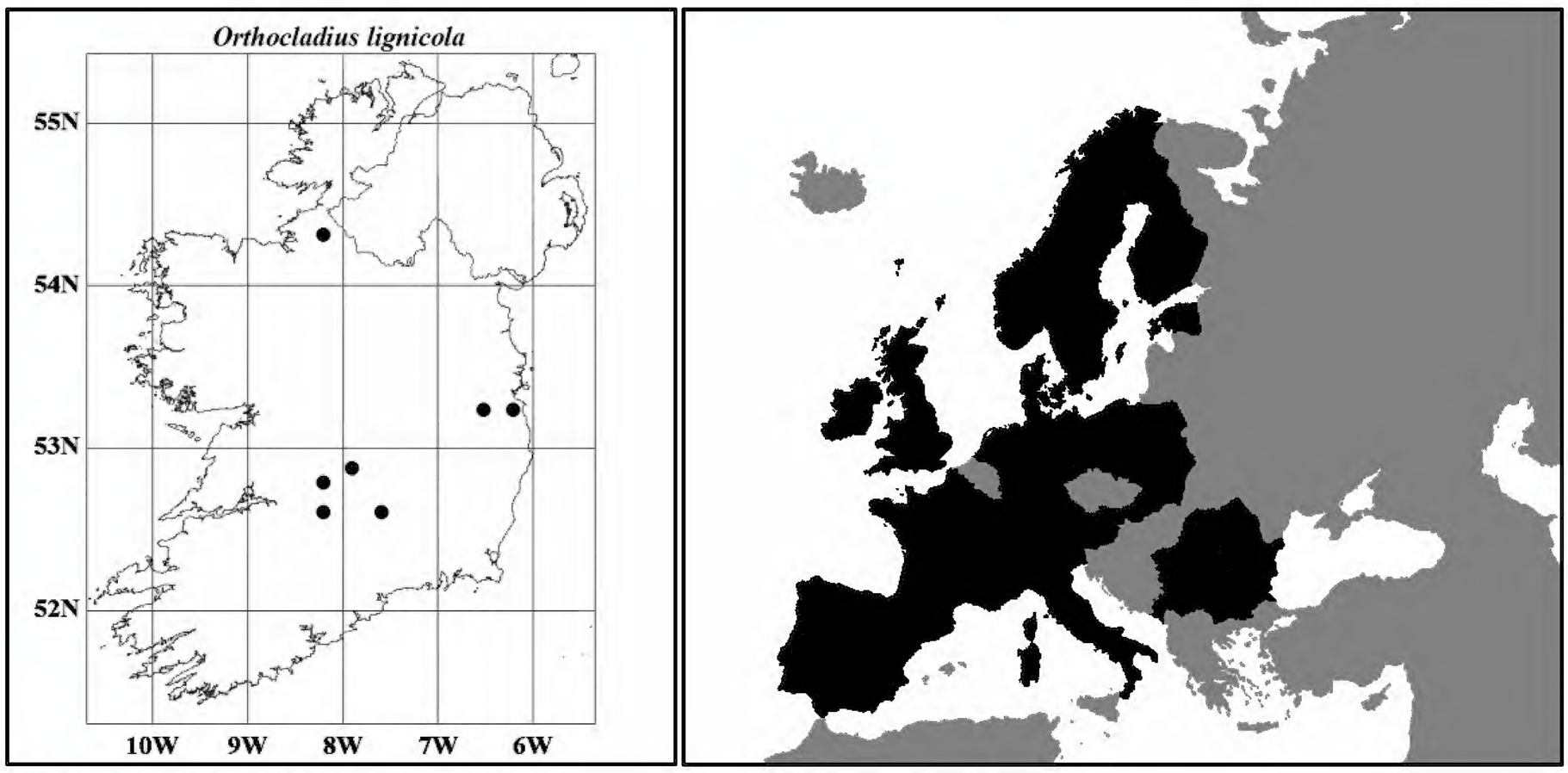


FIGURES 445-446. *Orthocladius wetterensis* Brundin, 1956.

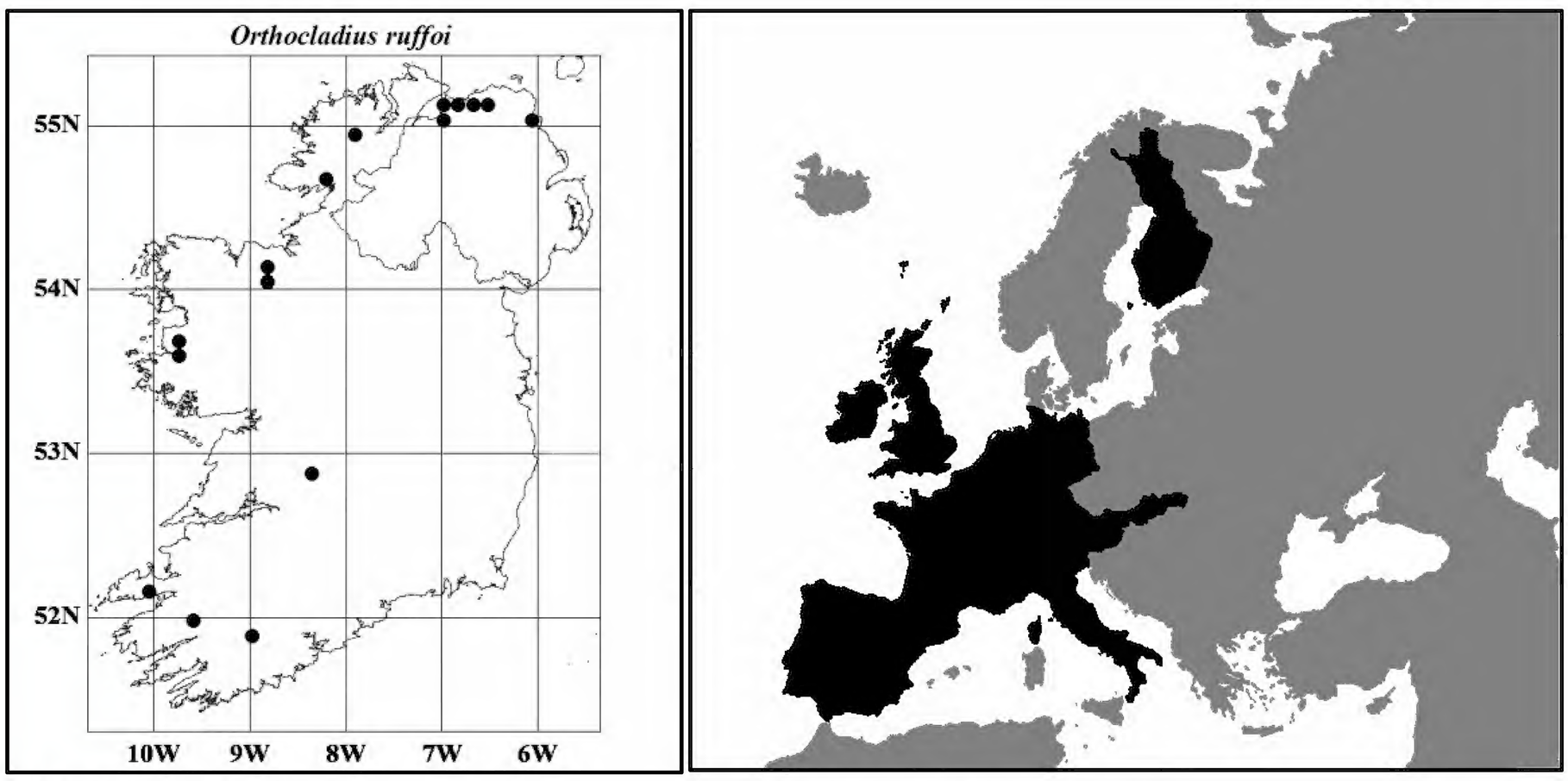


FIGURES 447-448. *Orthocladius consobrinus* (Holmgren, 1869).

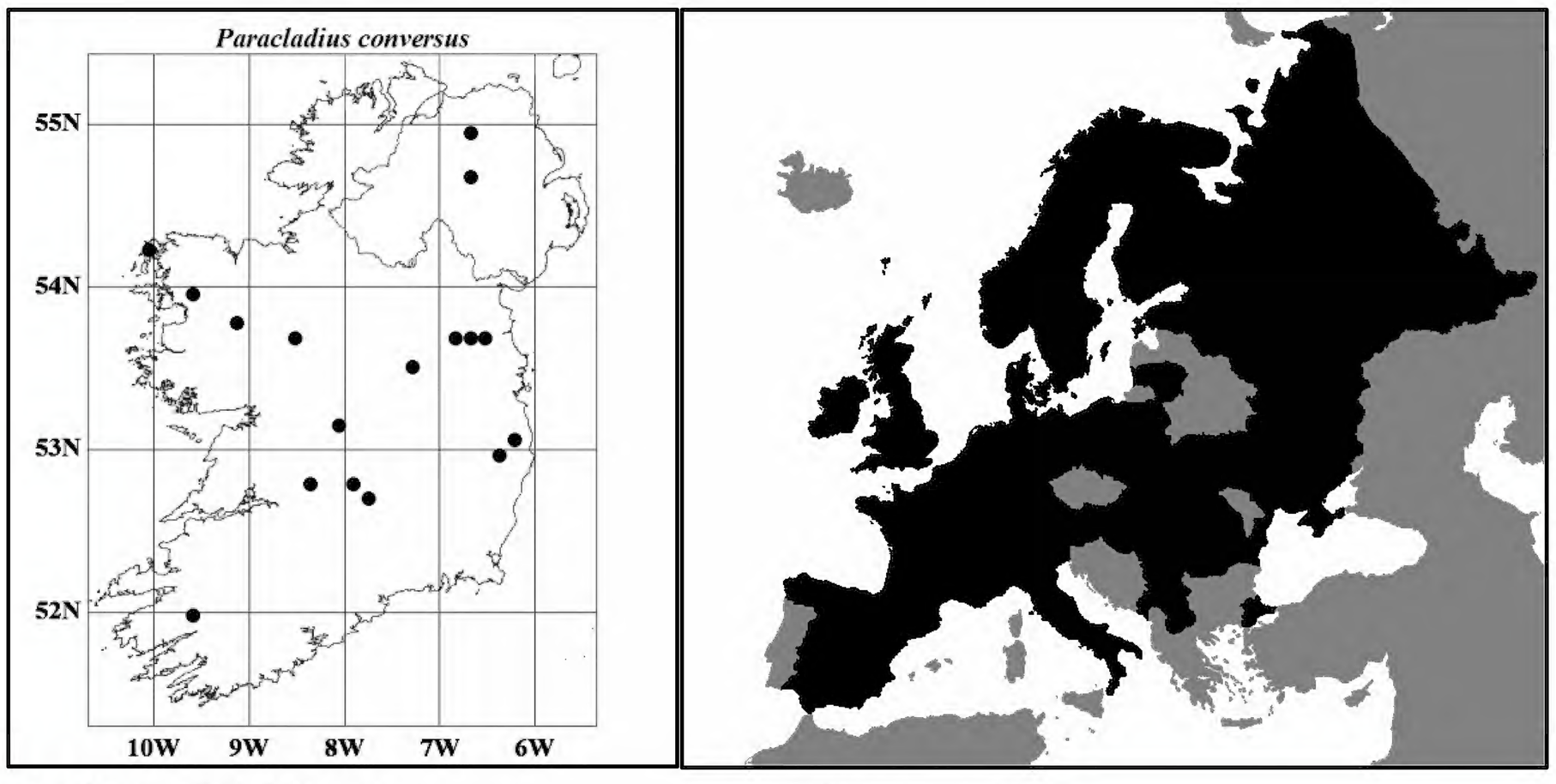
FIGURES 449-450. *Orthocladius holsatus* Goetghebuer, 1937.



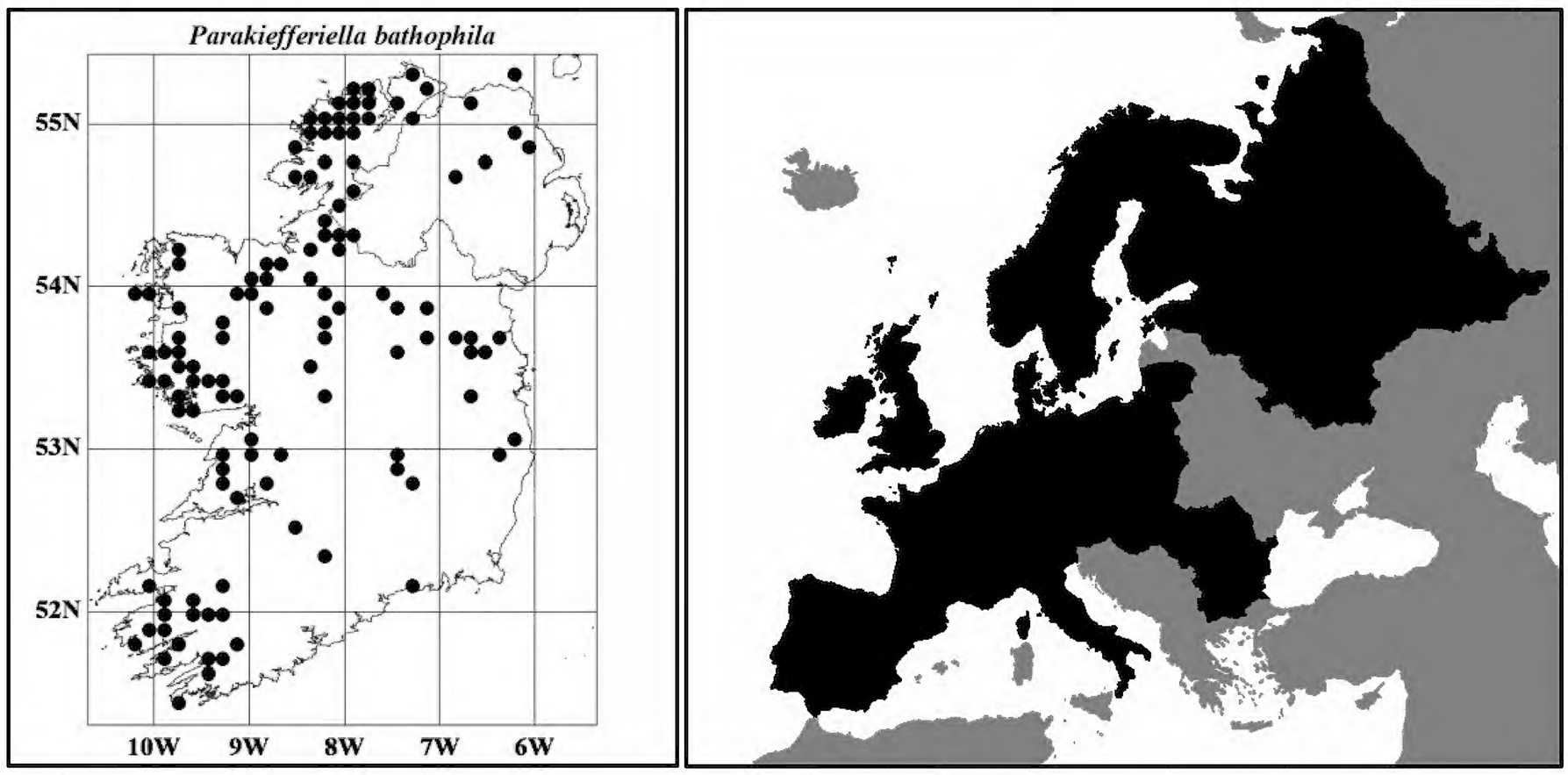
FIGURES 451-452. *Orthocladius lignicola* Kieffer, 1914.



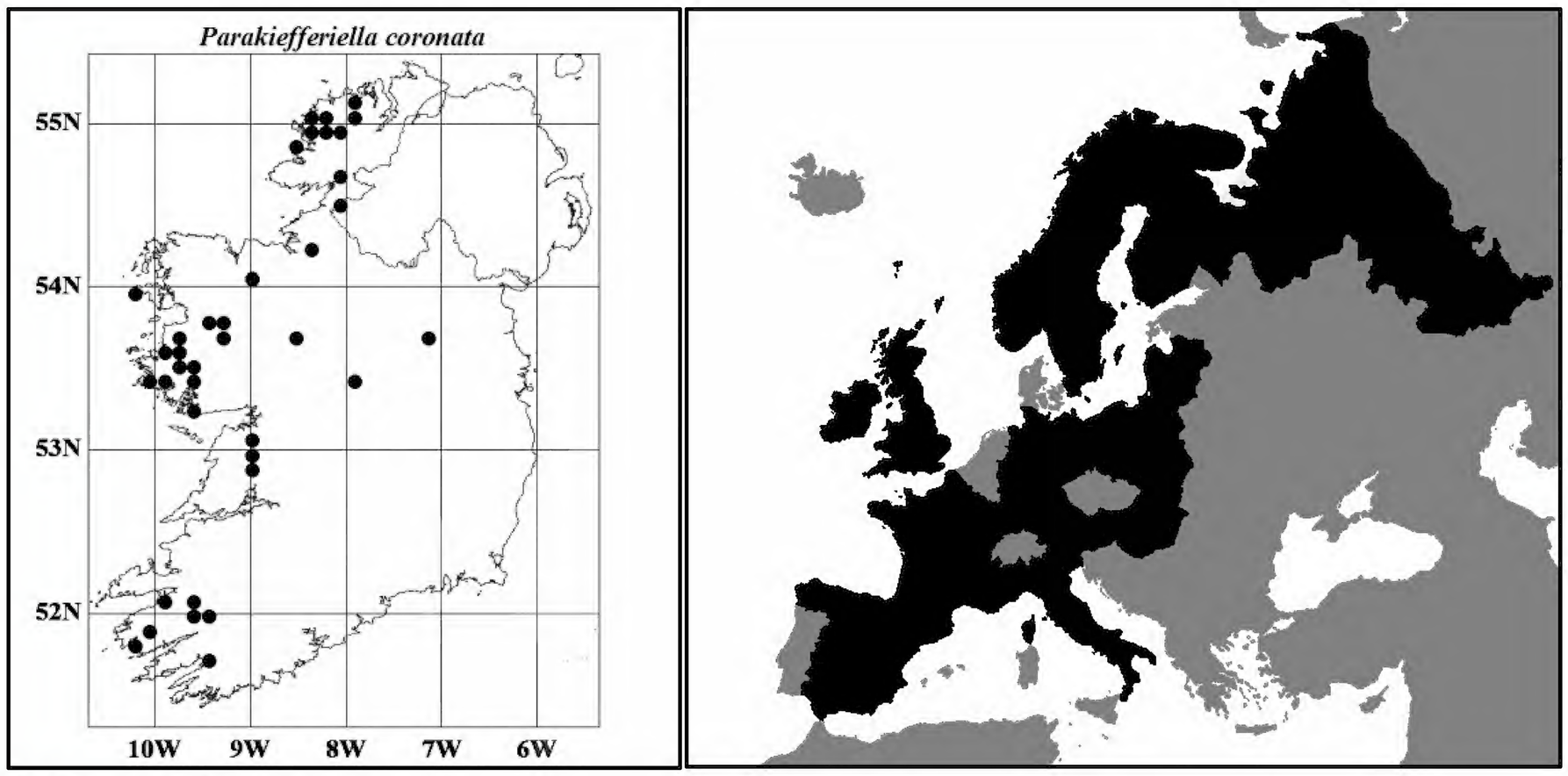
FIGURES 453-454. *Orthocladius ruffoi* Rossaro & Prato, 1991.



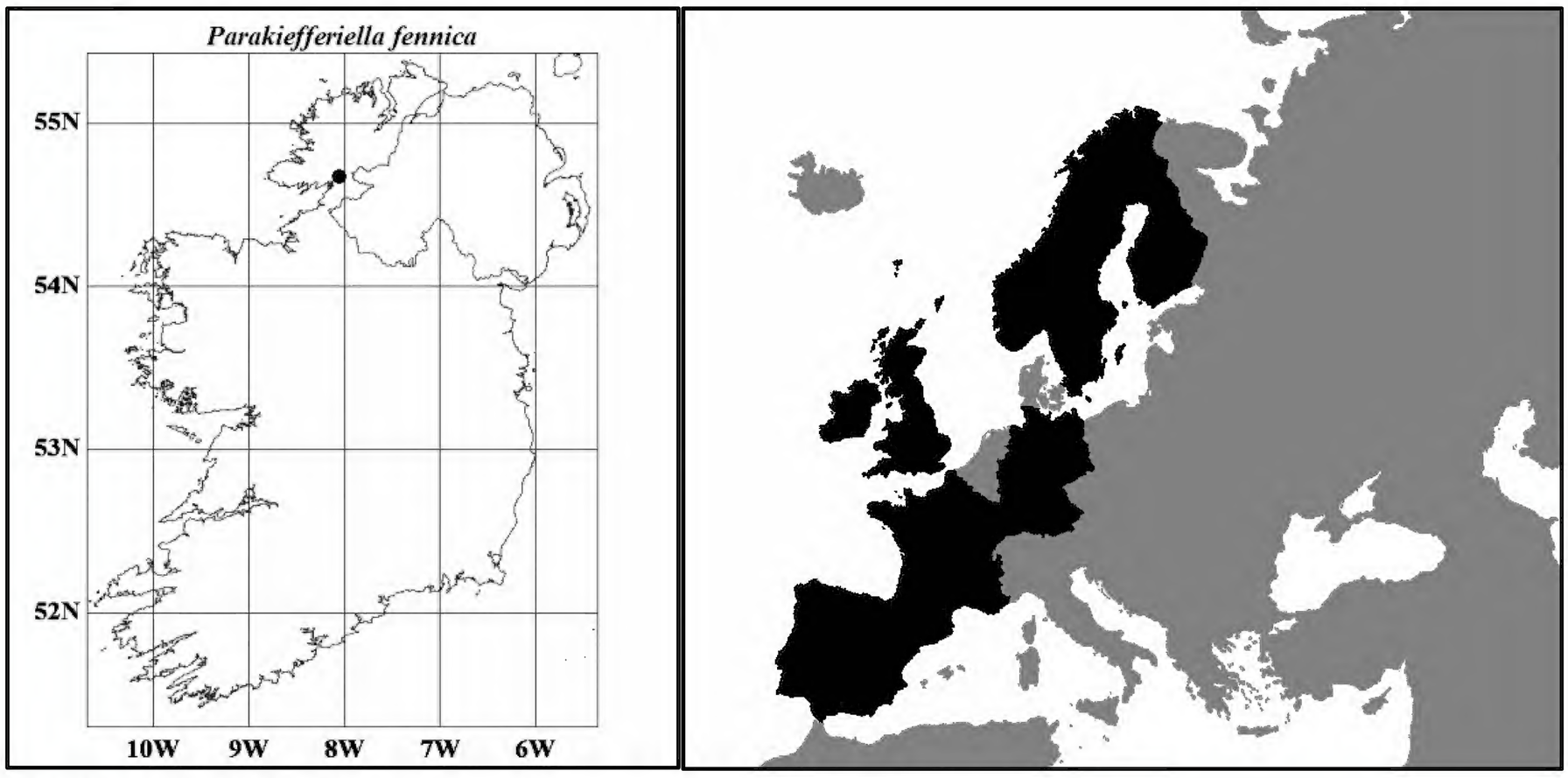
FIGURES 455-456. *Paracladius conversus* (Walker, 1856).



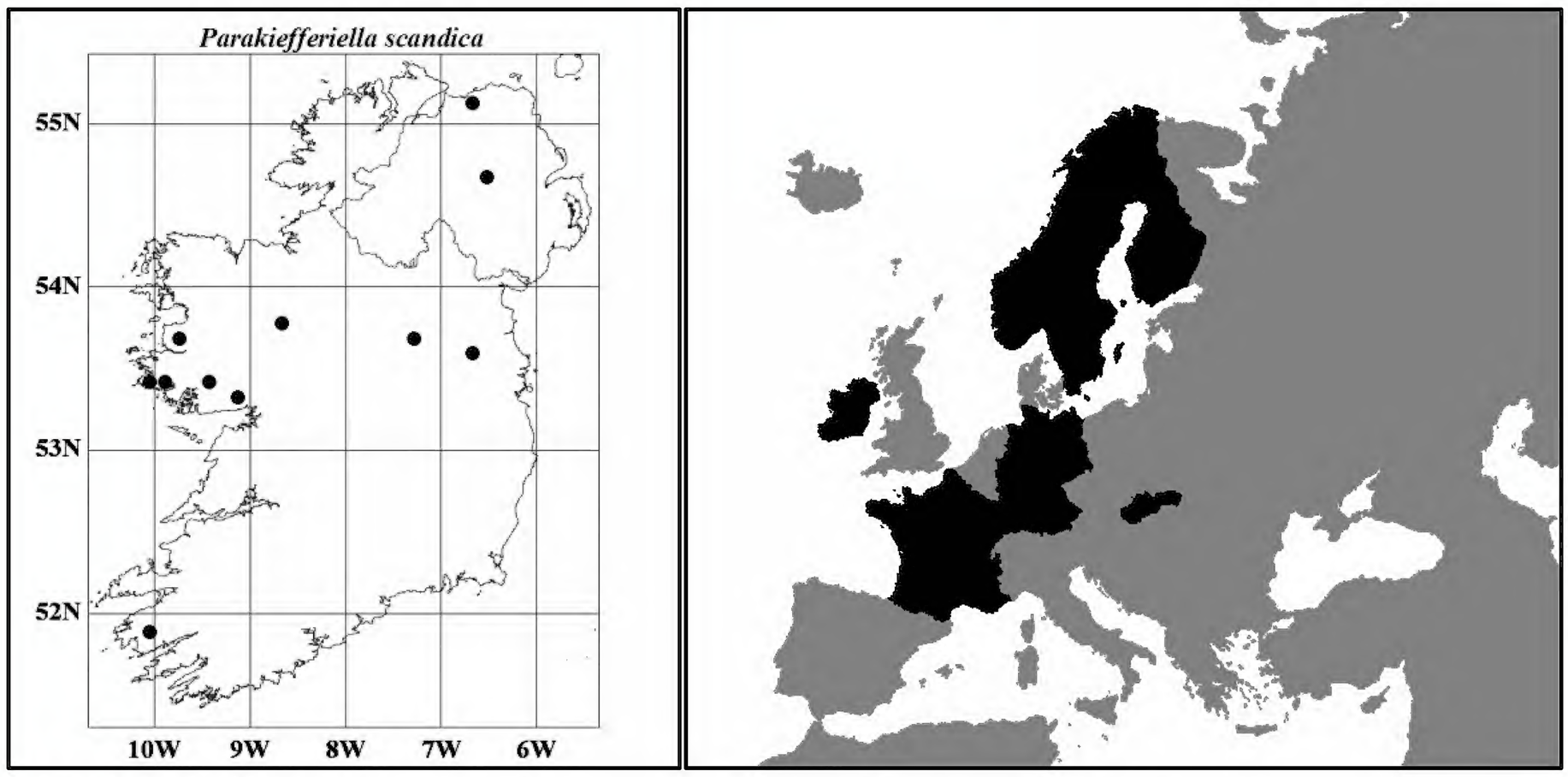
FIGURES 457-458. *Parakiefferiella bathophila* (Kieffer, 1912).



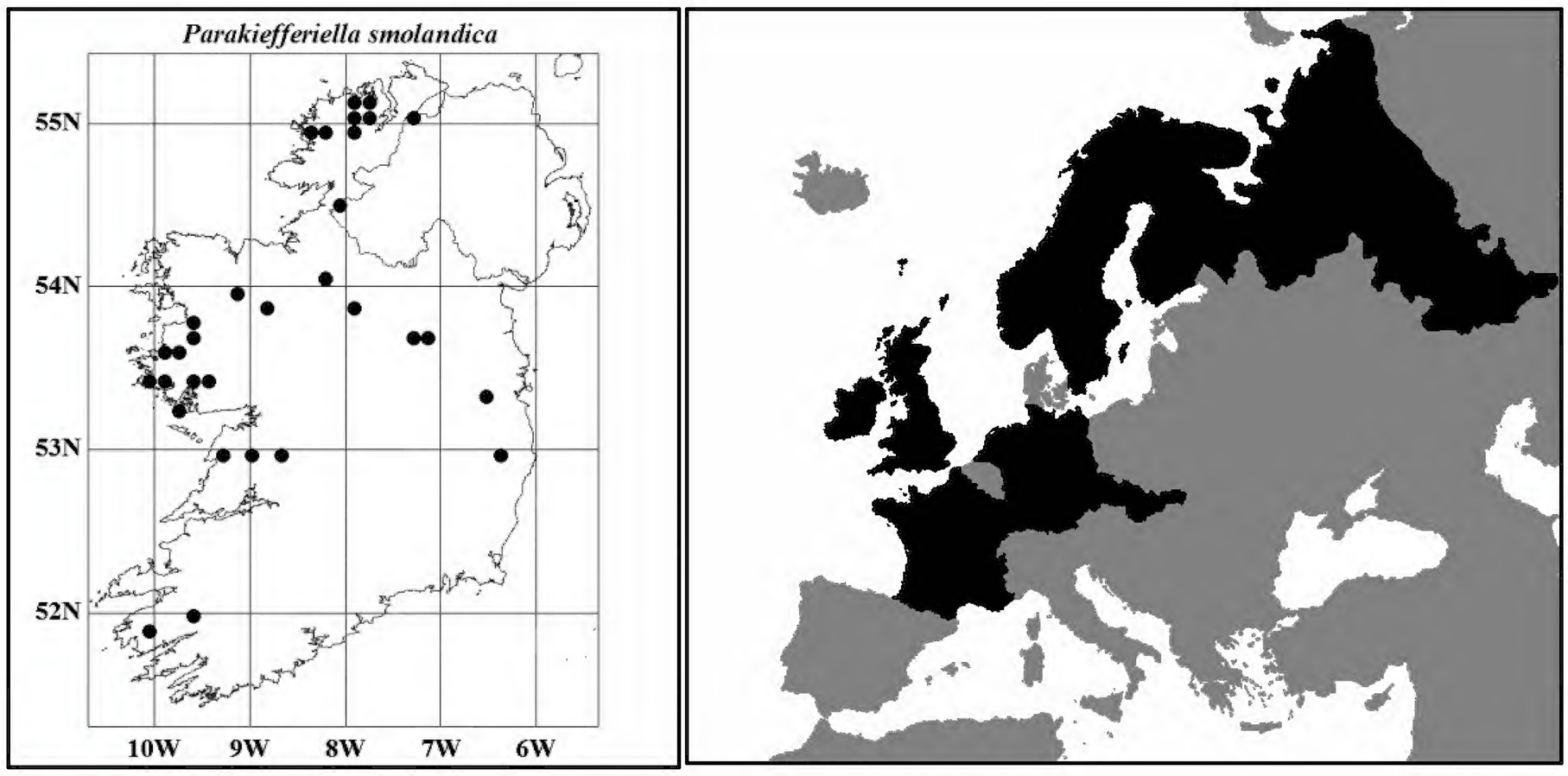
FIGURES 459-460. *Parakiefferiella coronata* (Edwards, 1929).



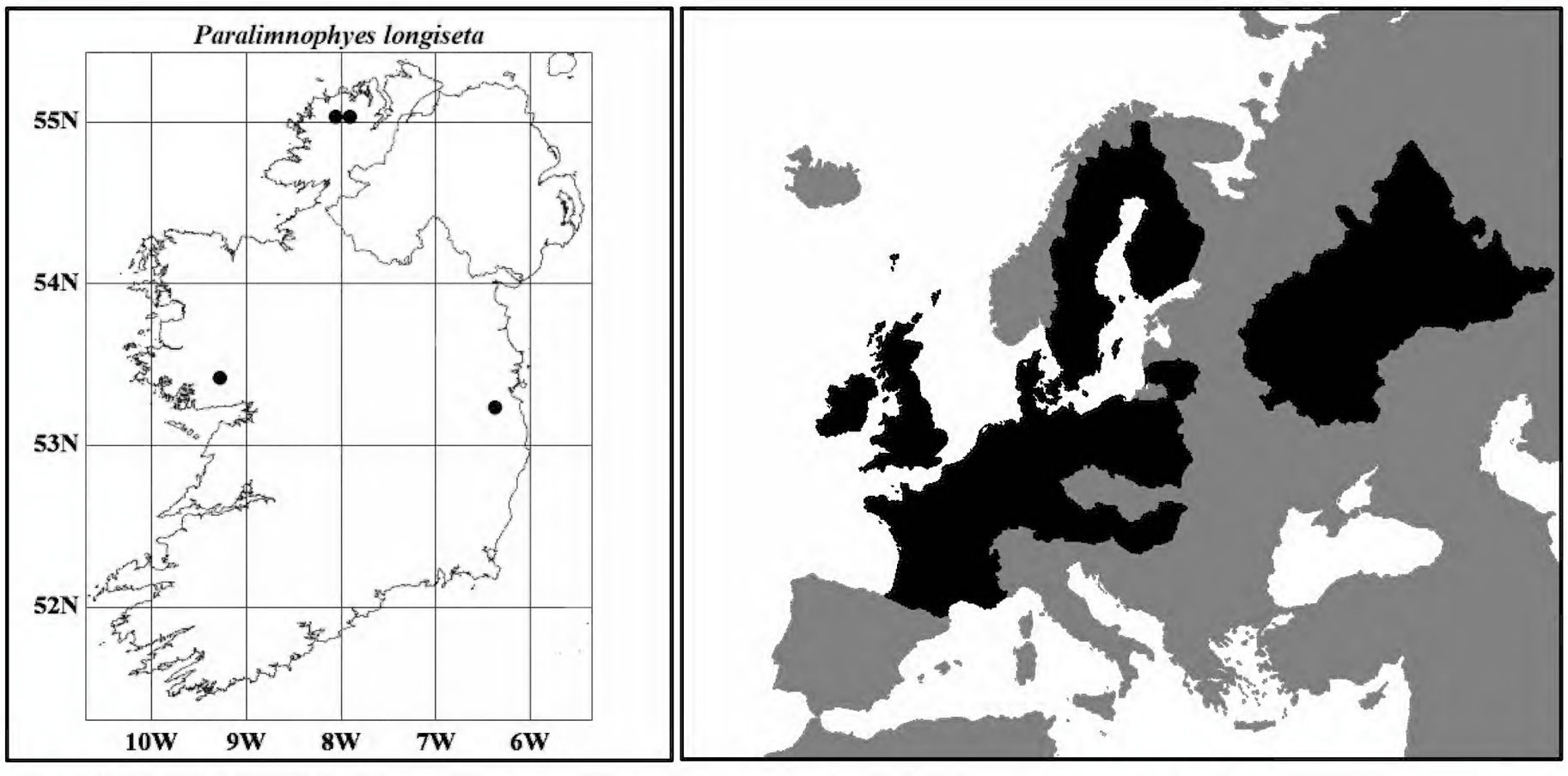
FIGURES 461-462. *Parakiefferiella fennica* Tuiskunen, 1986.



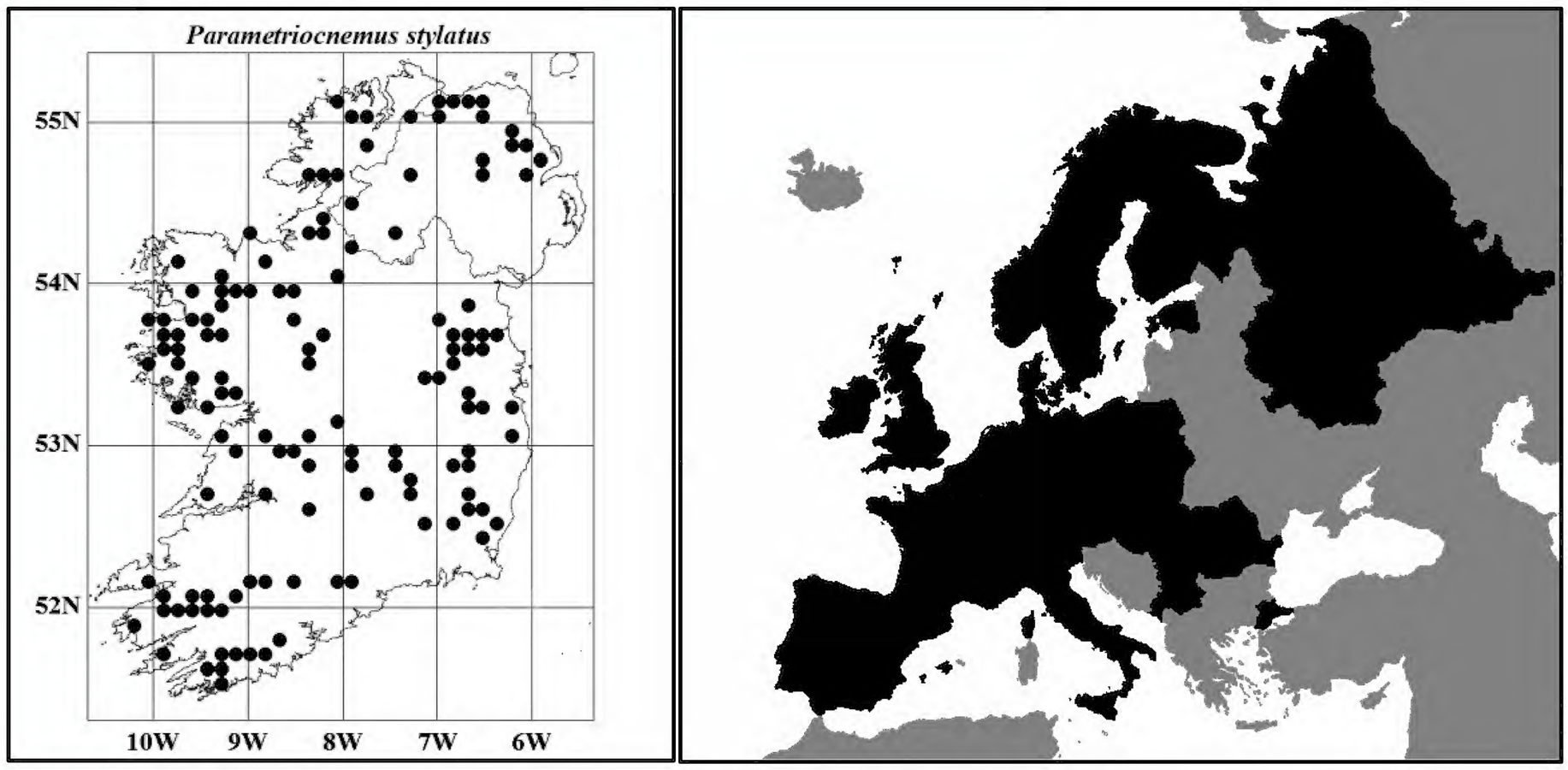
FIGURES 463-464. *Parakiefferiella scandica* (Brundin, 1947).



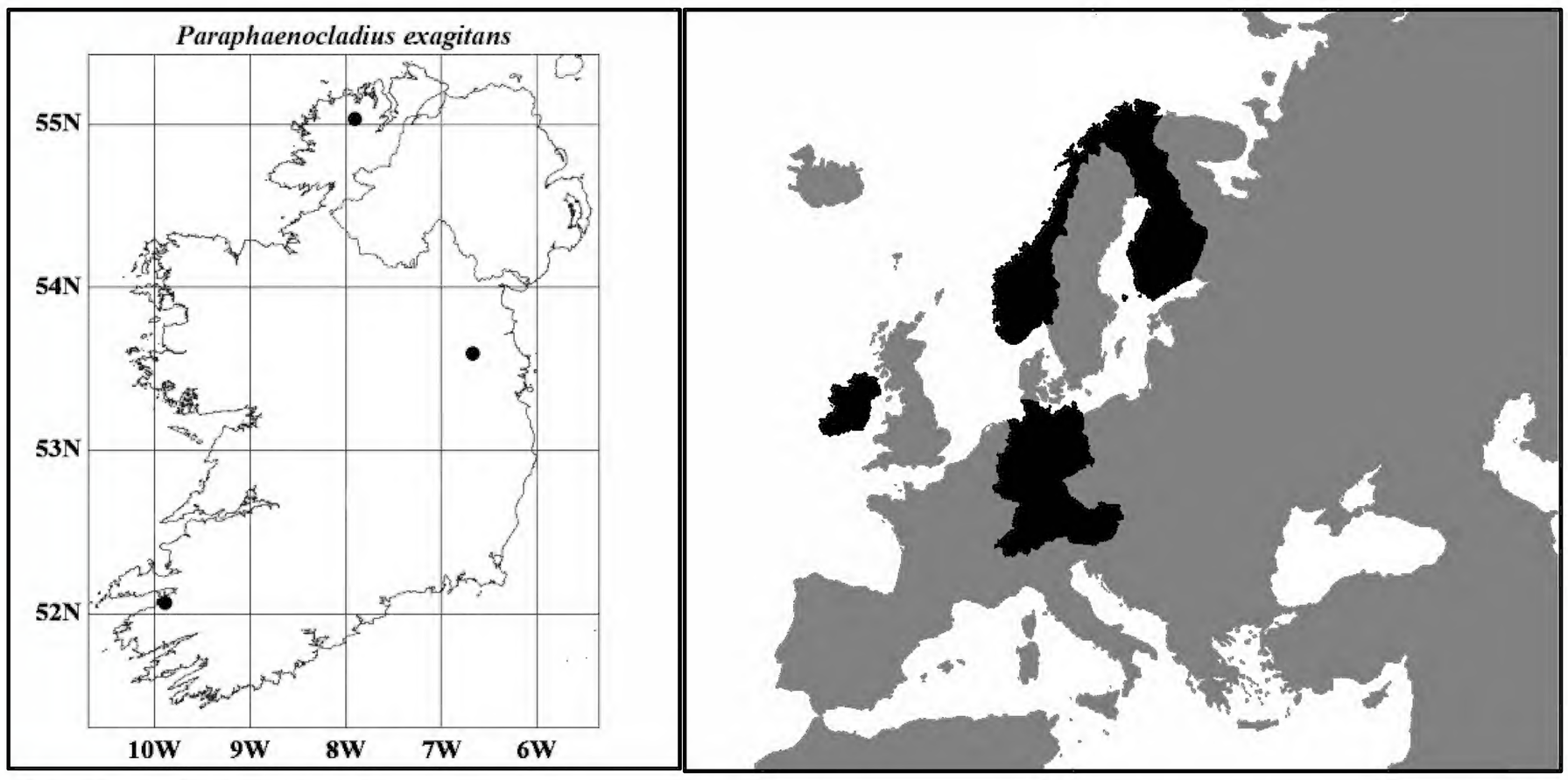
FIGURES 465-466. *Parakiefferiella smolandica* (Brundin, 1947).



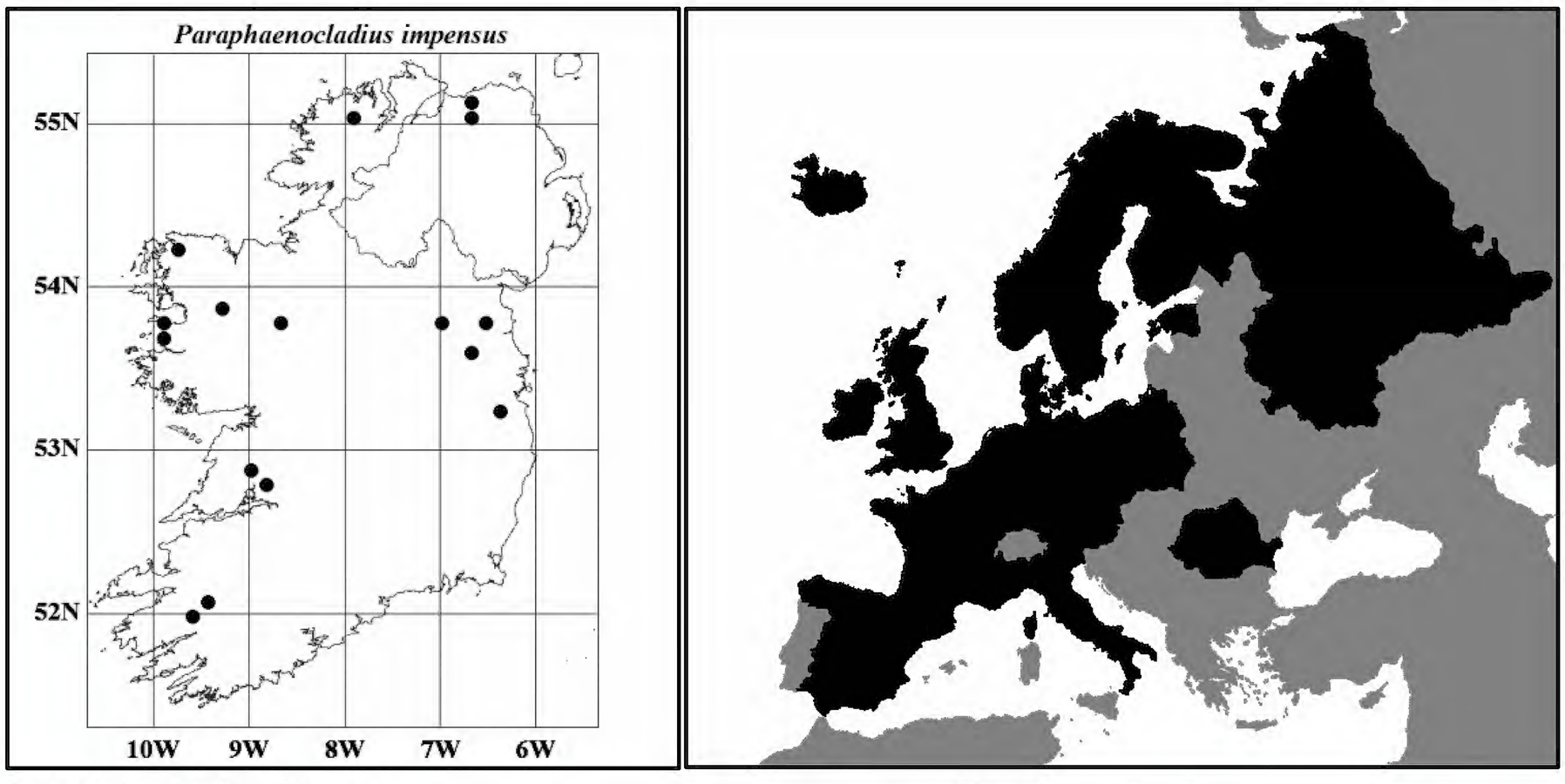
FIGURES 467-468. *Paralimnophyes longiseta* (Thienemann, 1919).



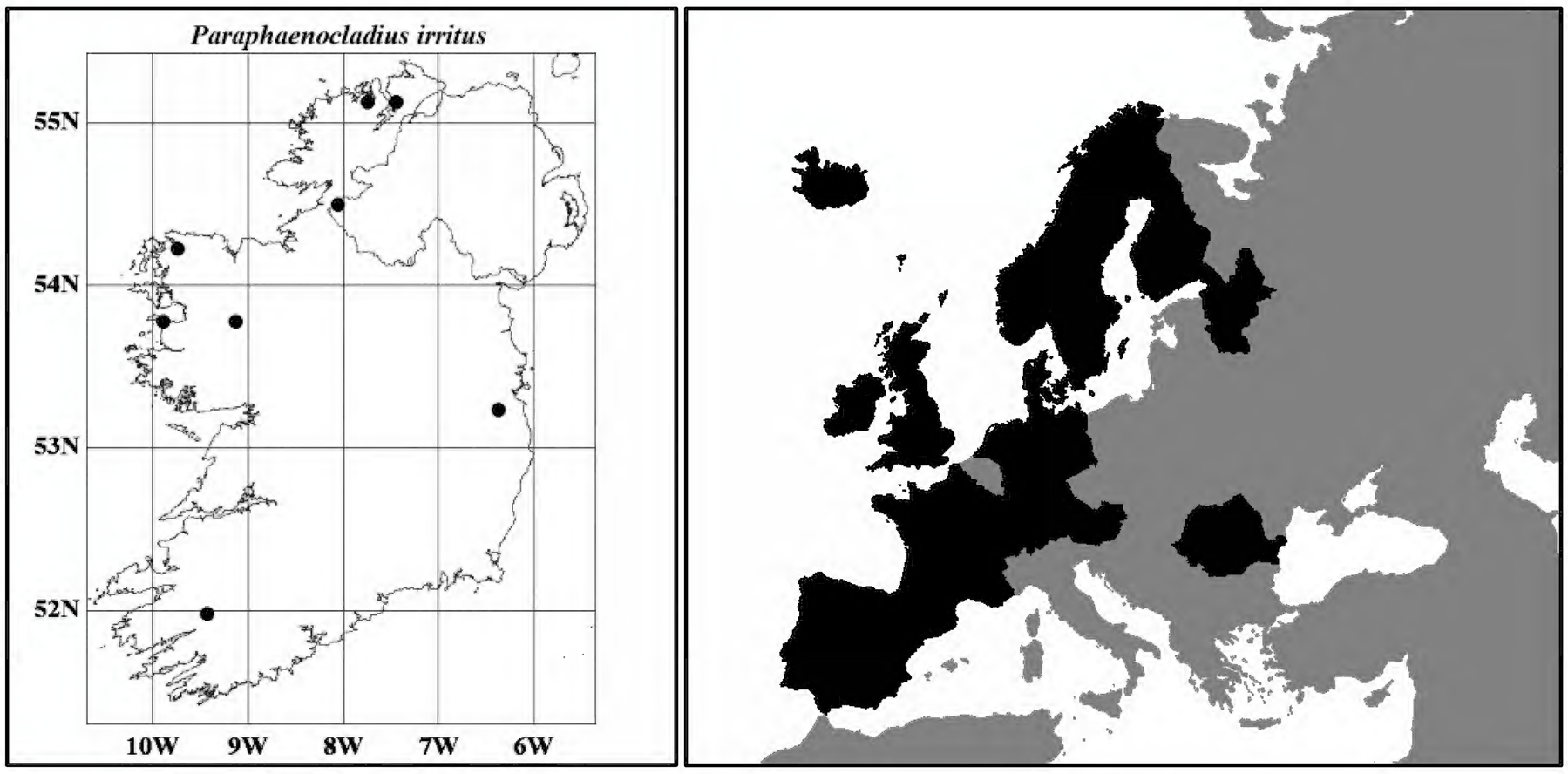
FIGURES 469-470. *Parametriocnemus stylatus* (Spärck, 1923).



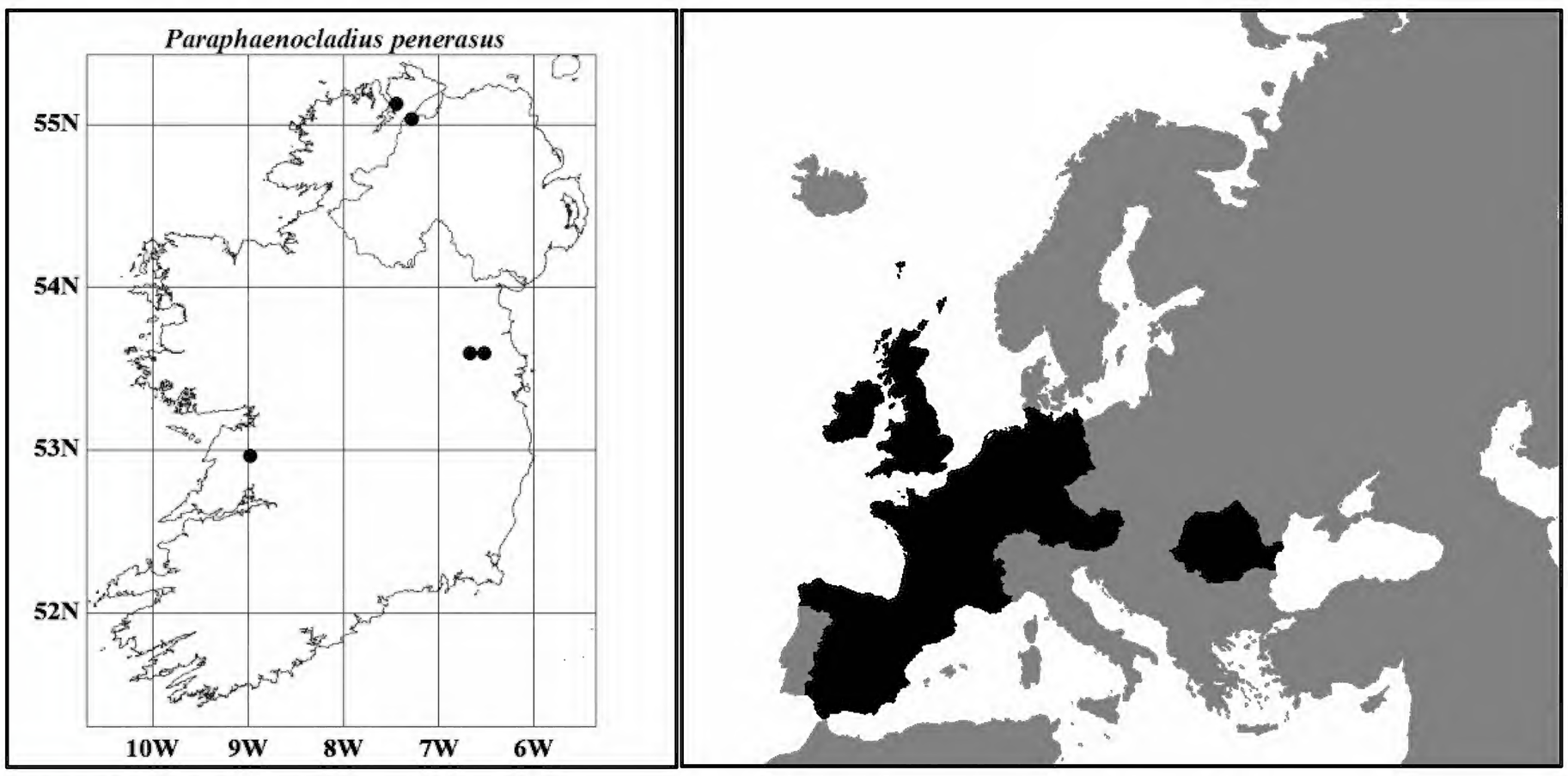
FIGURES 471-472. *Paraphaenocladius exagitans monticola* Strenzke, 1950.



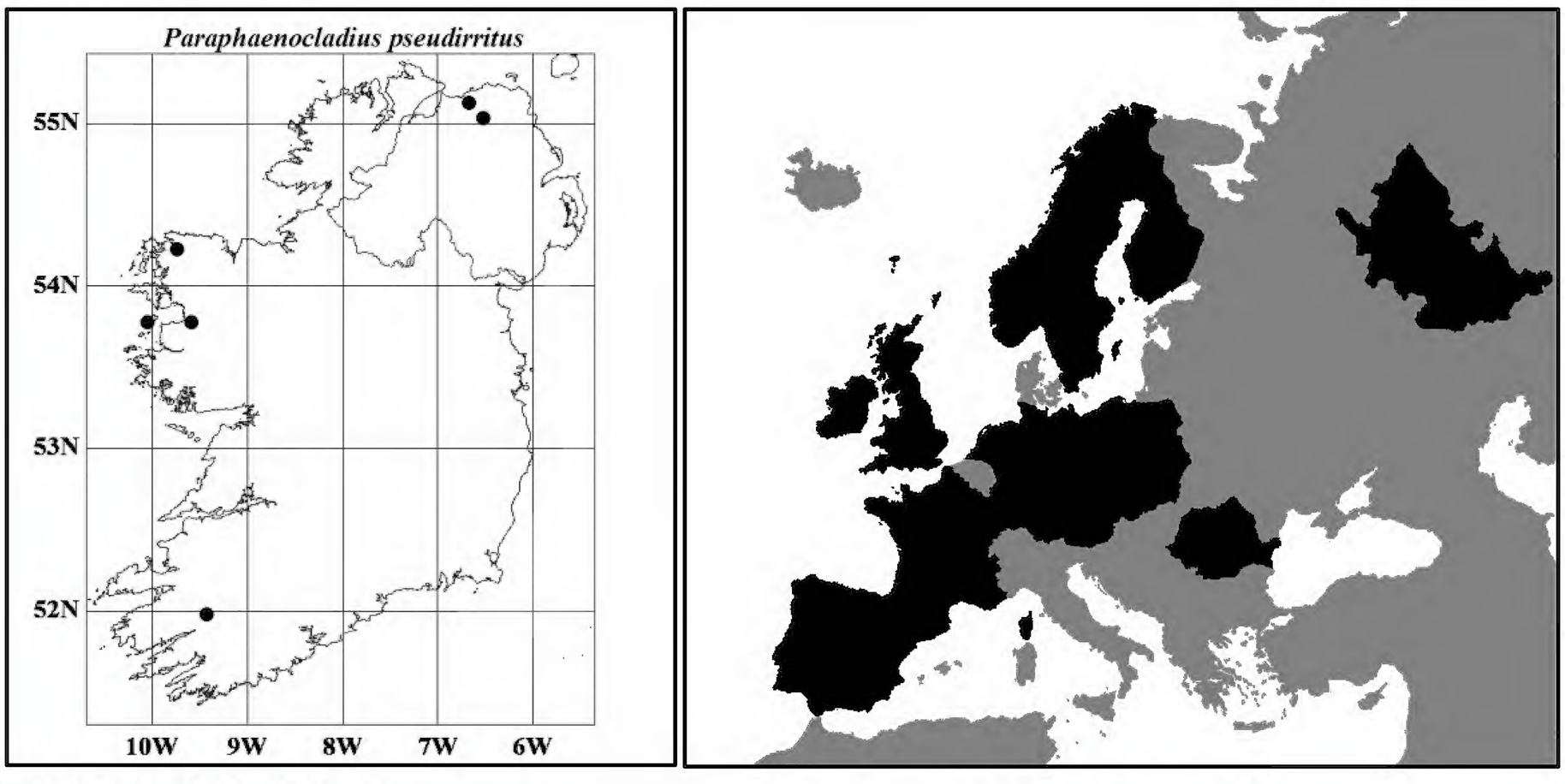
FIGURES 473-474. *Paraphaenocladius impensus* (Walker, 1856).



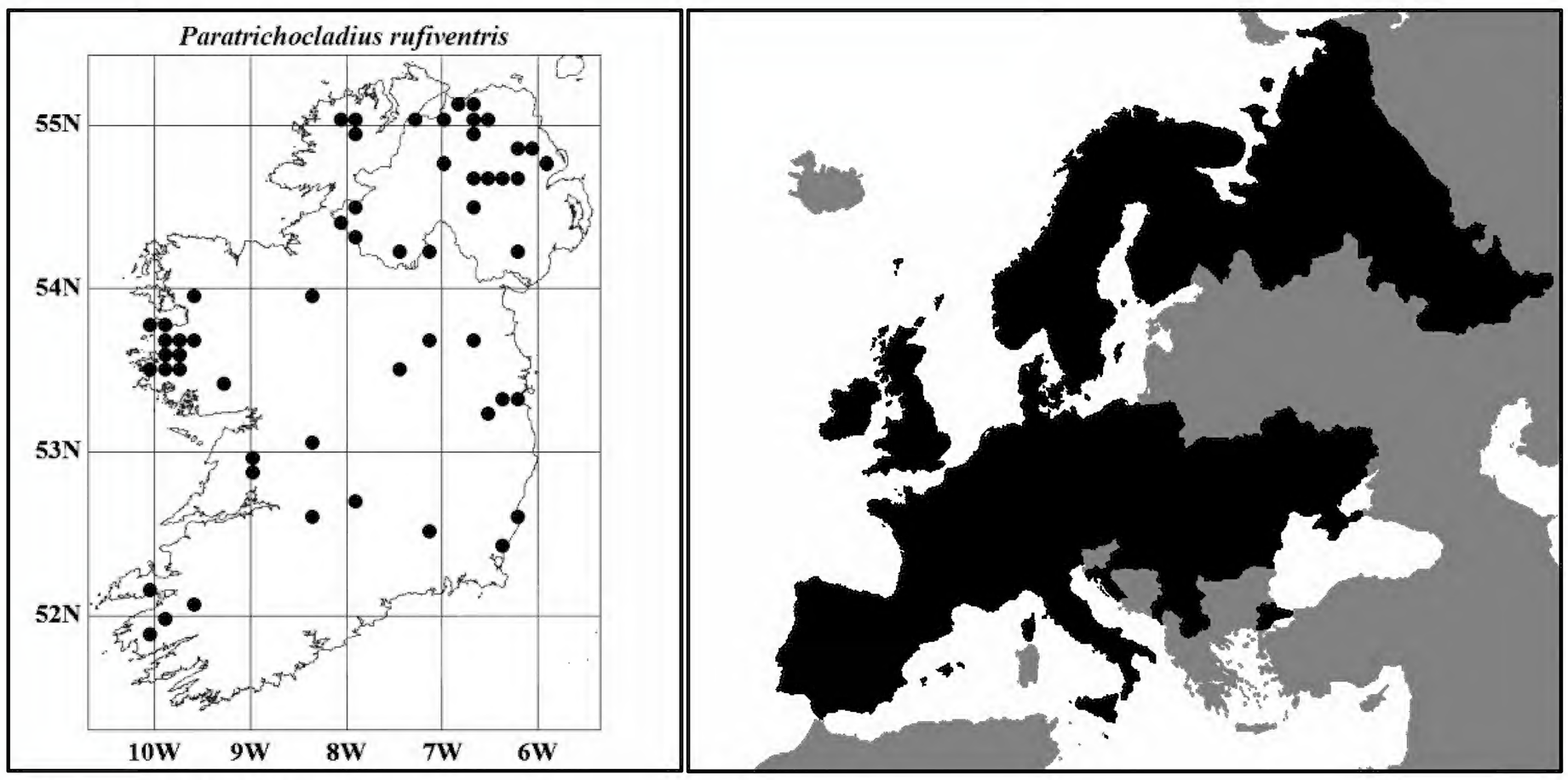
FIGURES 475-476. *Paraphaenocladius irritus* (Walker, 1856).



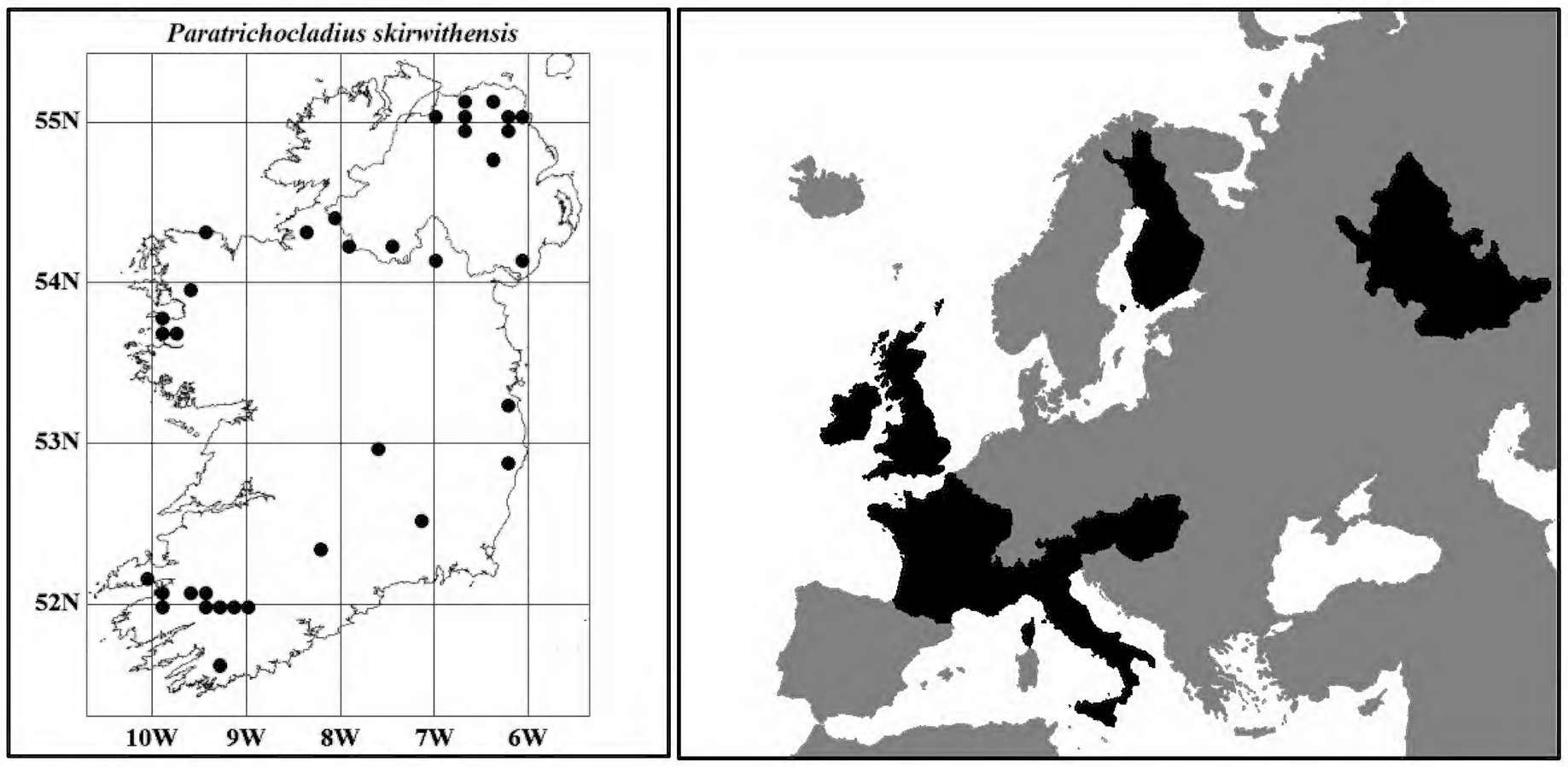
FIGURES 477-478. *Paraphaenocladius penerasus* (Edwards, 1929).



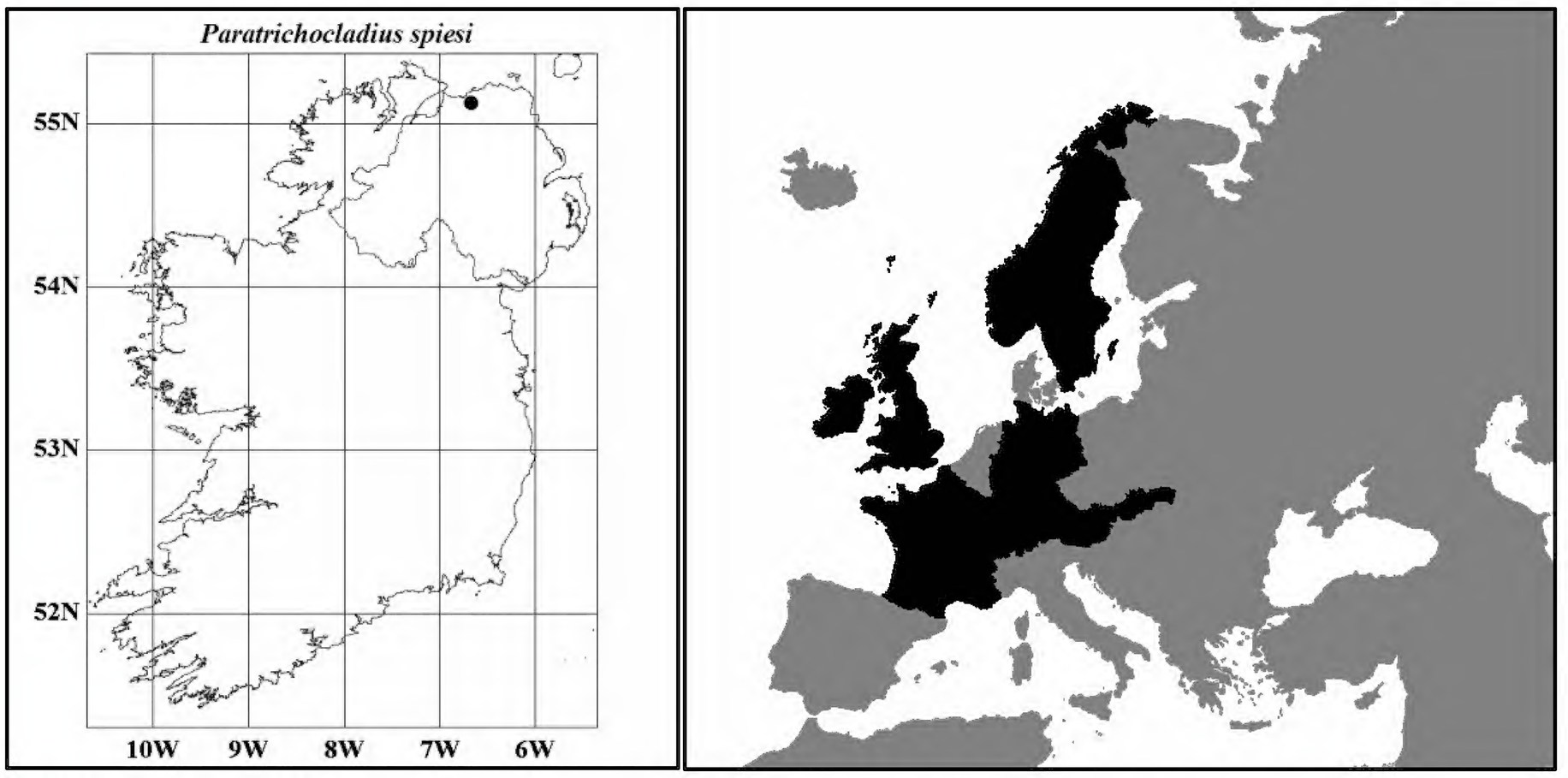
FIGURES 479-480. *Paraphaenocladius pseudirritus* Strenzke, 1950.



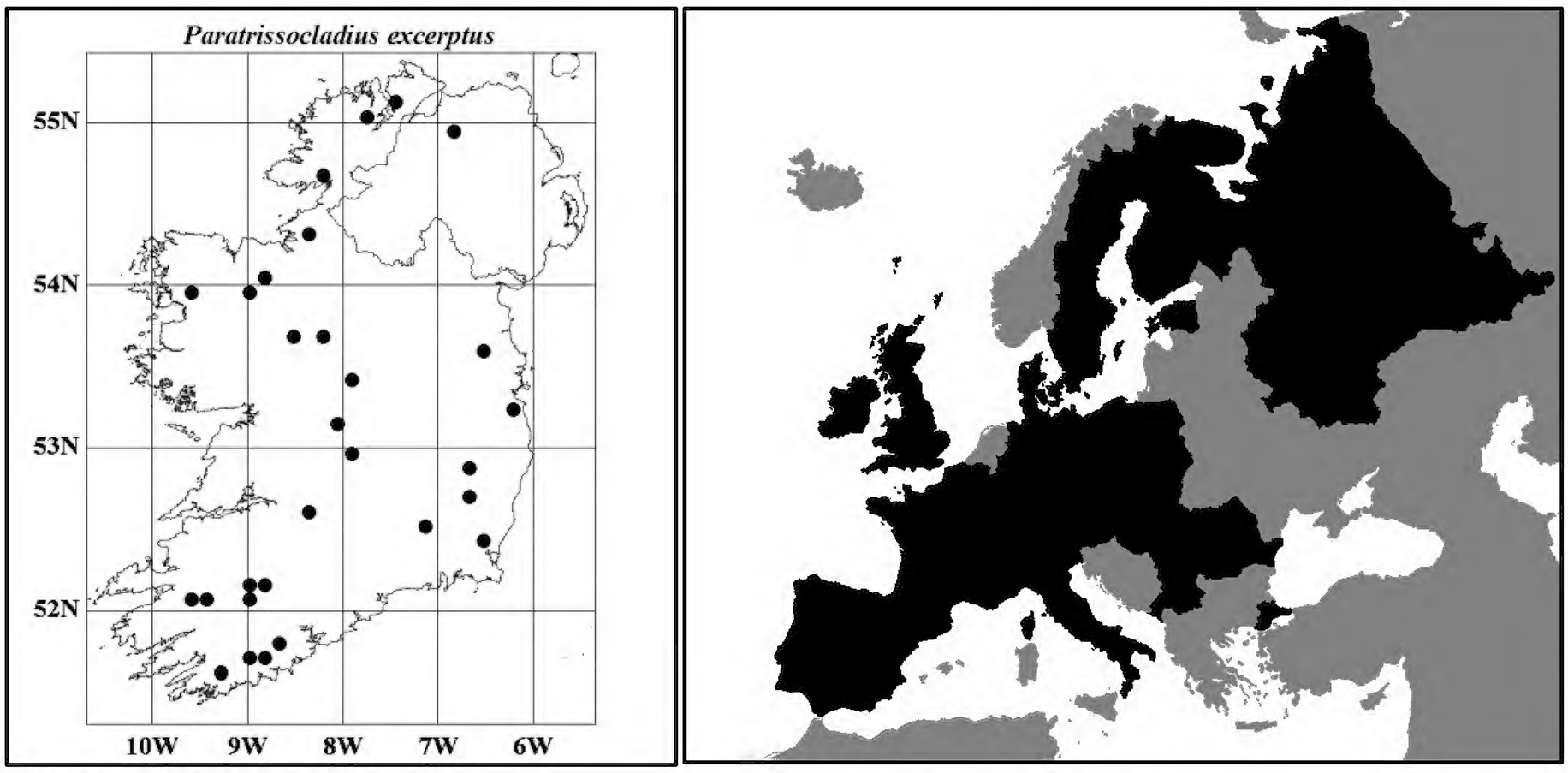
FIGURES 481-482. *Cricotopus rufiventris* (Meigen, 1830).



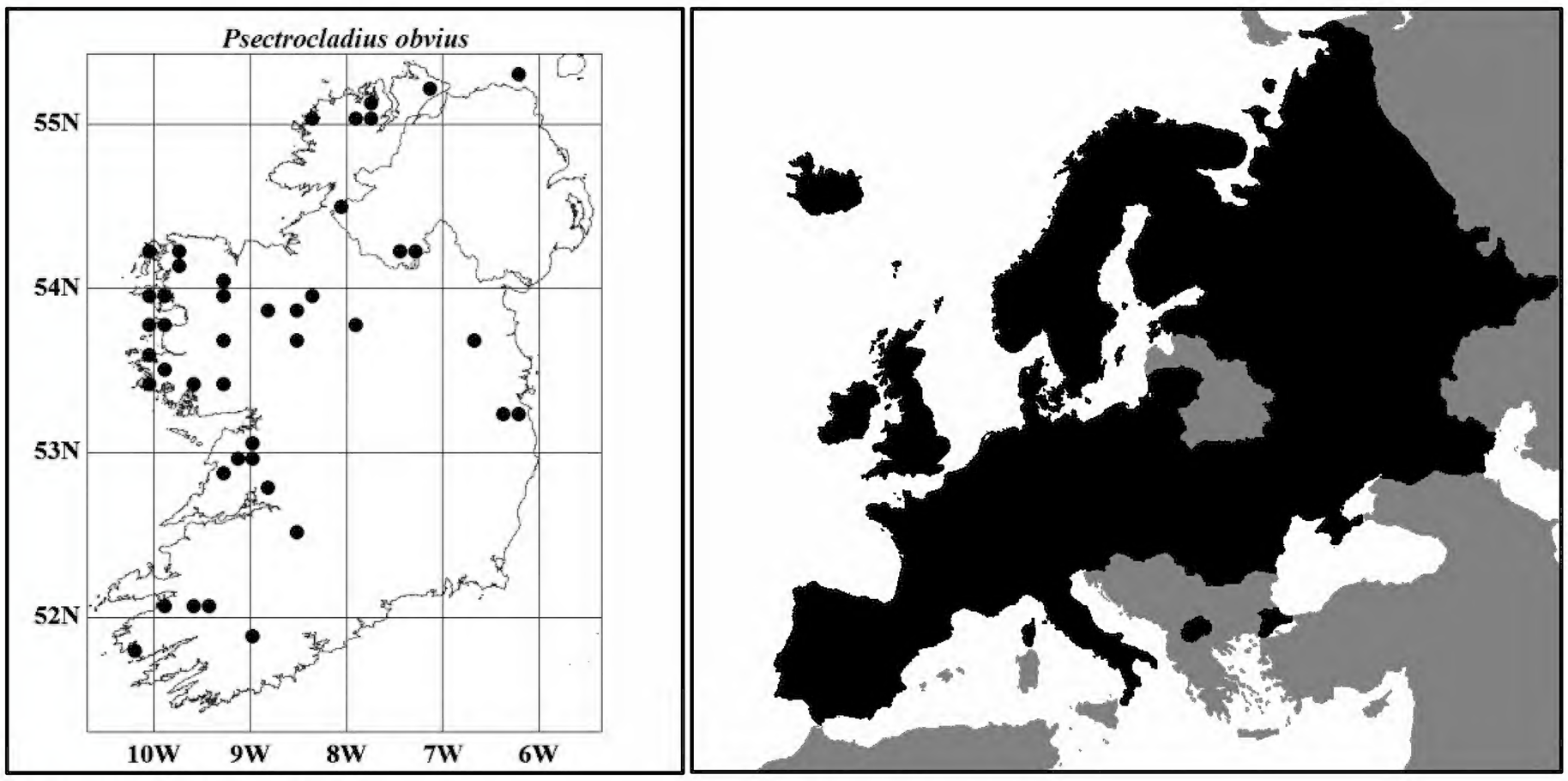
FIGURES 483-484. *Cricotopus skirwithensis* (Edwards, 1929).



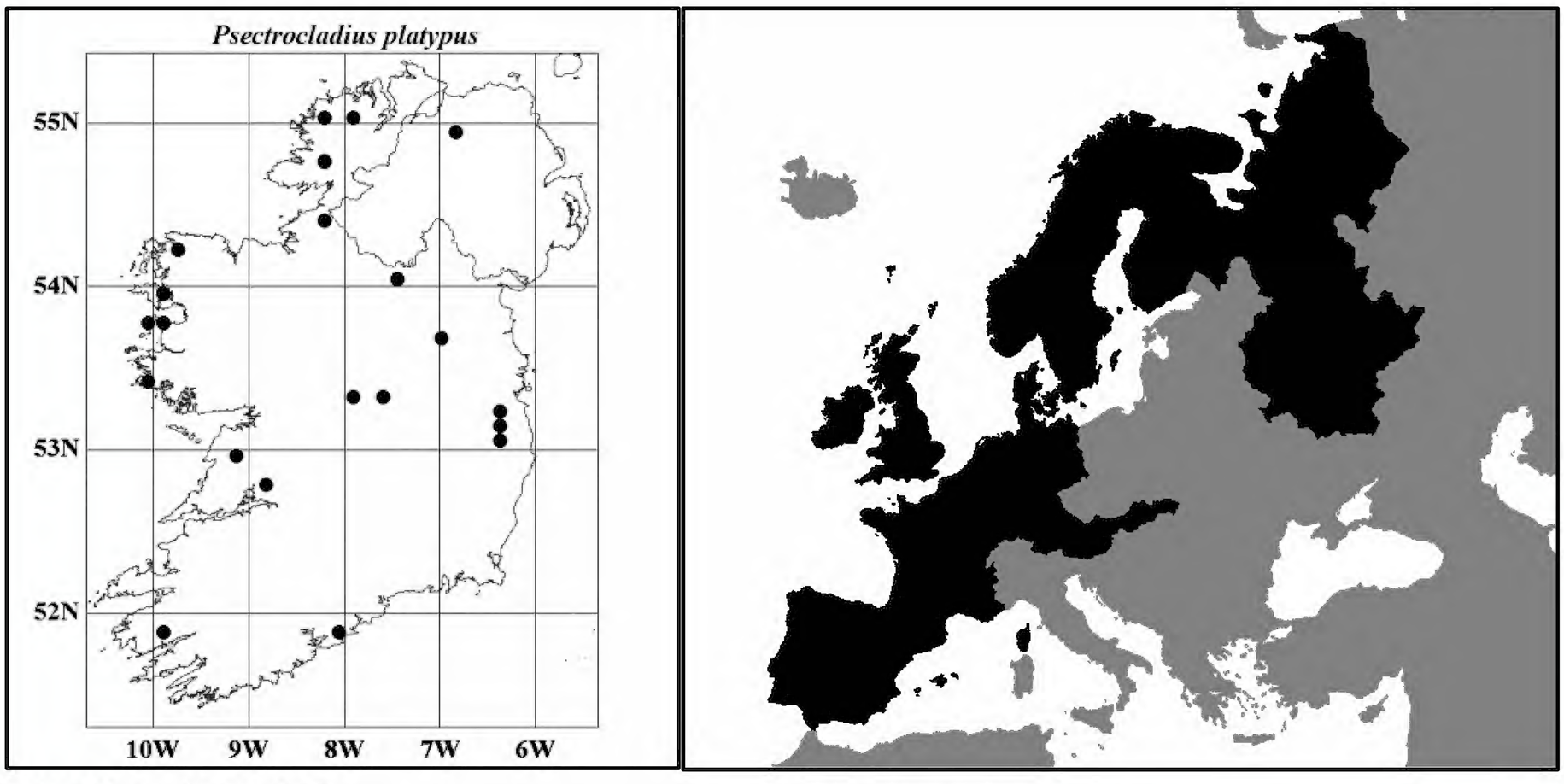
FIGURES 485-486. *Cricotopus spiesi* (Ashe & O'Connor, 2012).



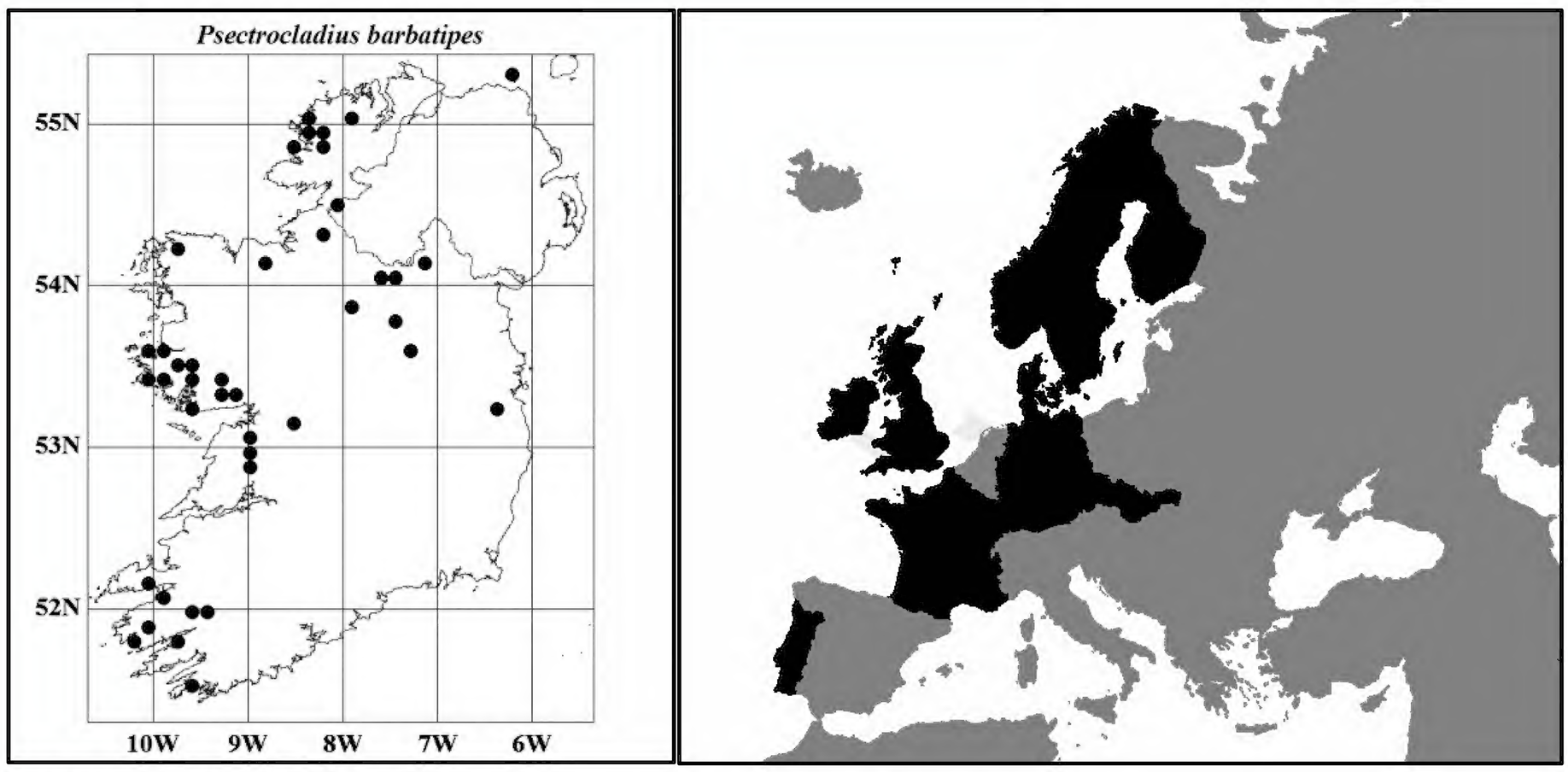
FIGURES 487-488. *Paratrissocladius excerptus* (Walker, 1856).



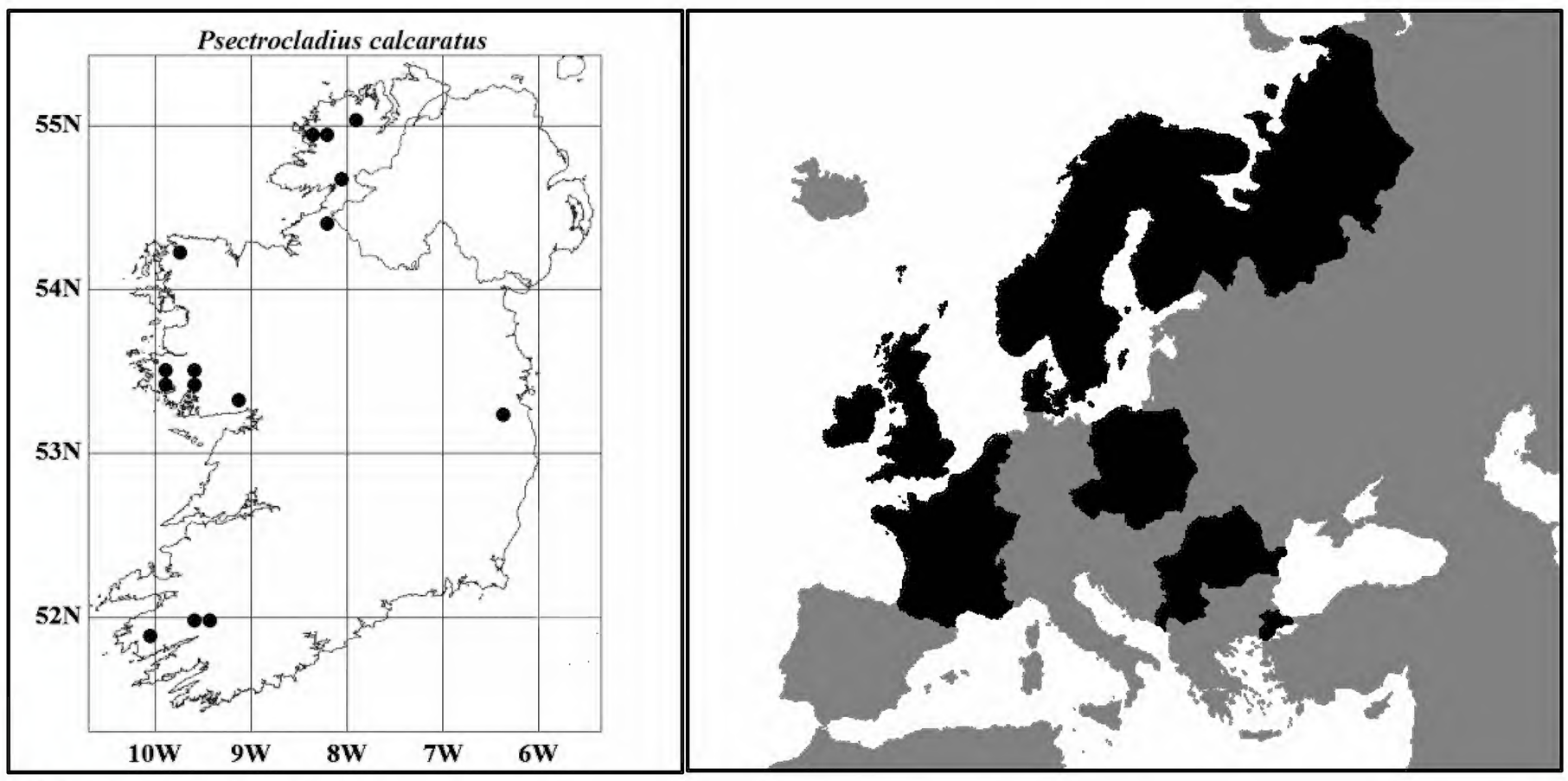
FIGURES 489-490. *Psectrocladius obvius* (Walker 1856).



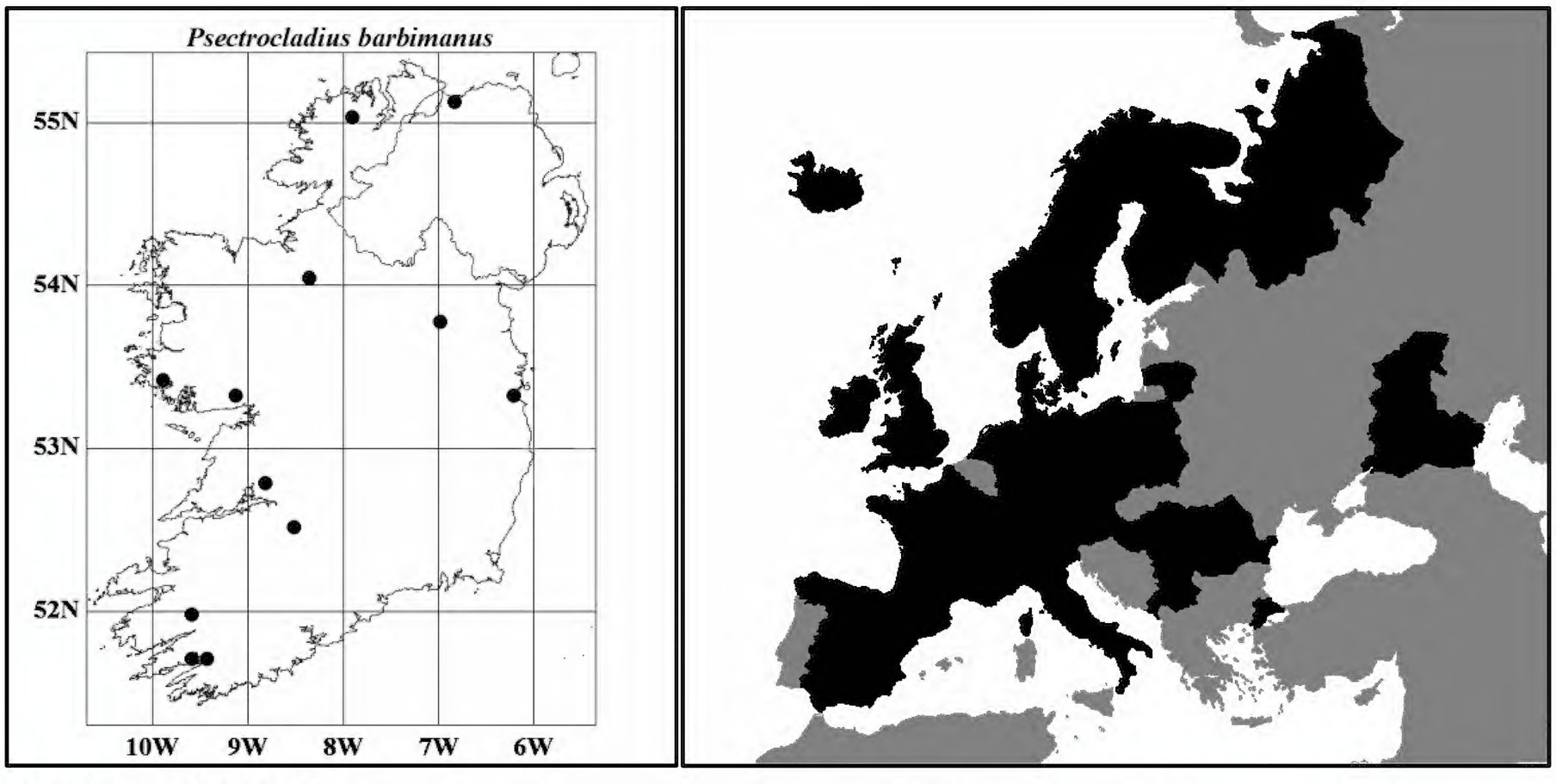
FIGURES 491-492. *Psectrocladius platypus* (Edwards, 1929).



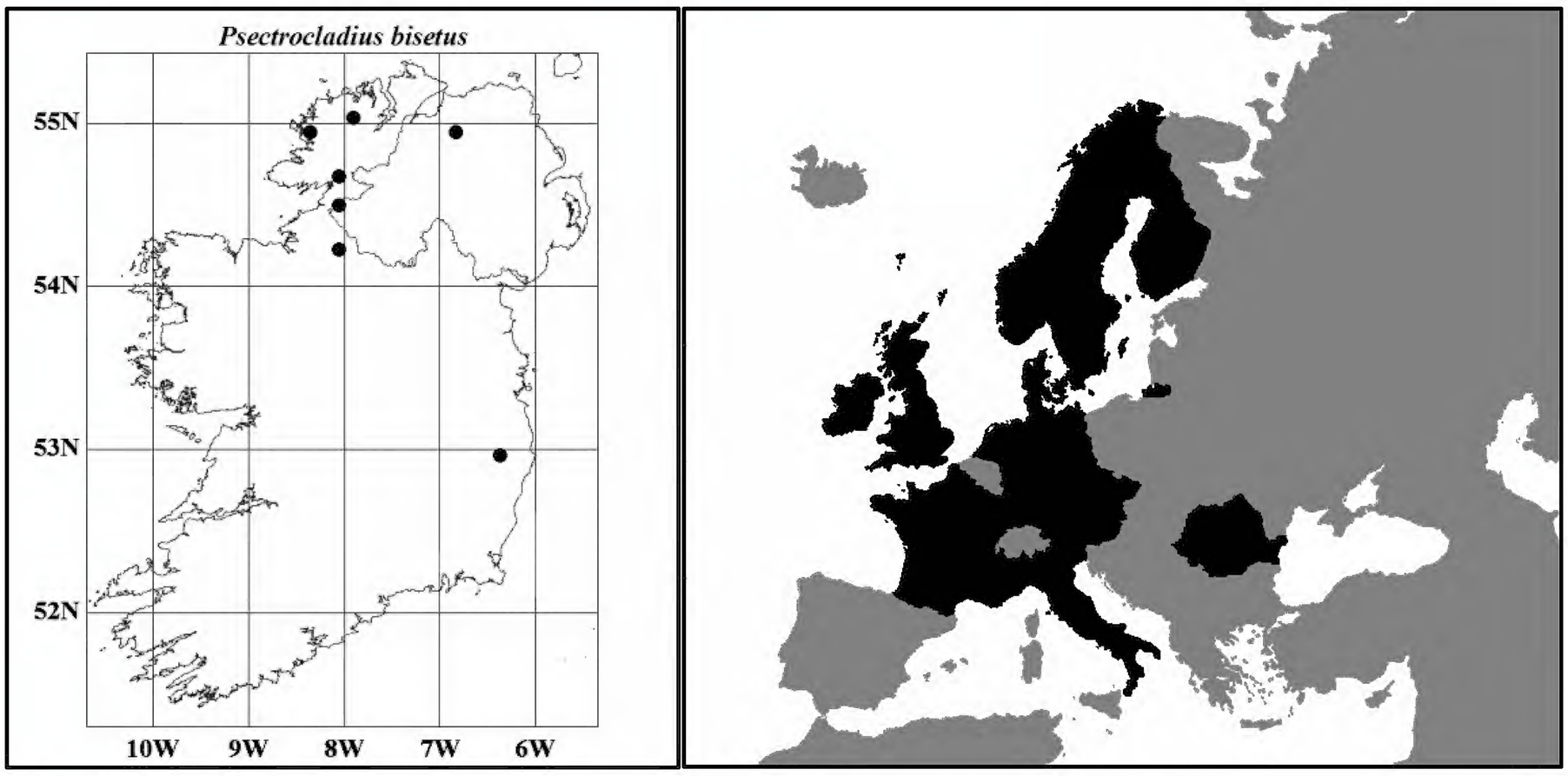
FIGURES 493-494. *Psectrocladius barbatipes* Kieffer, 1923.



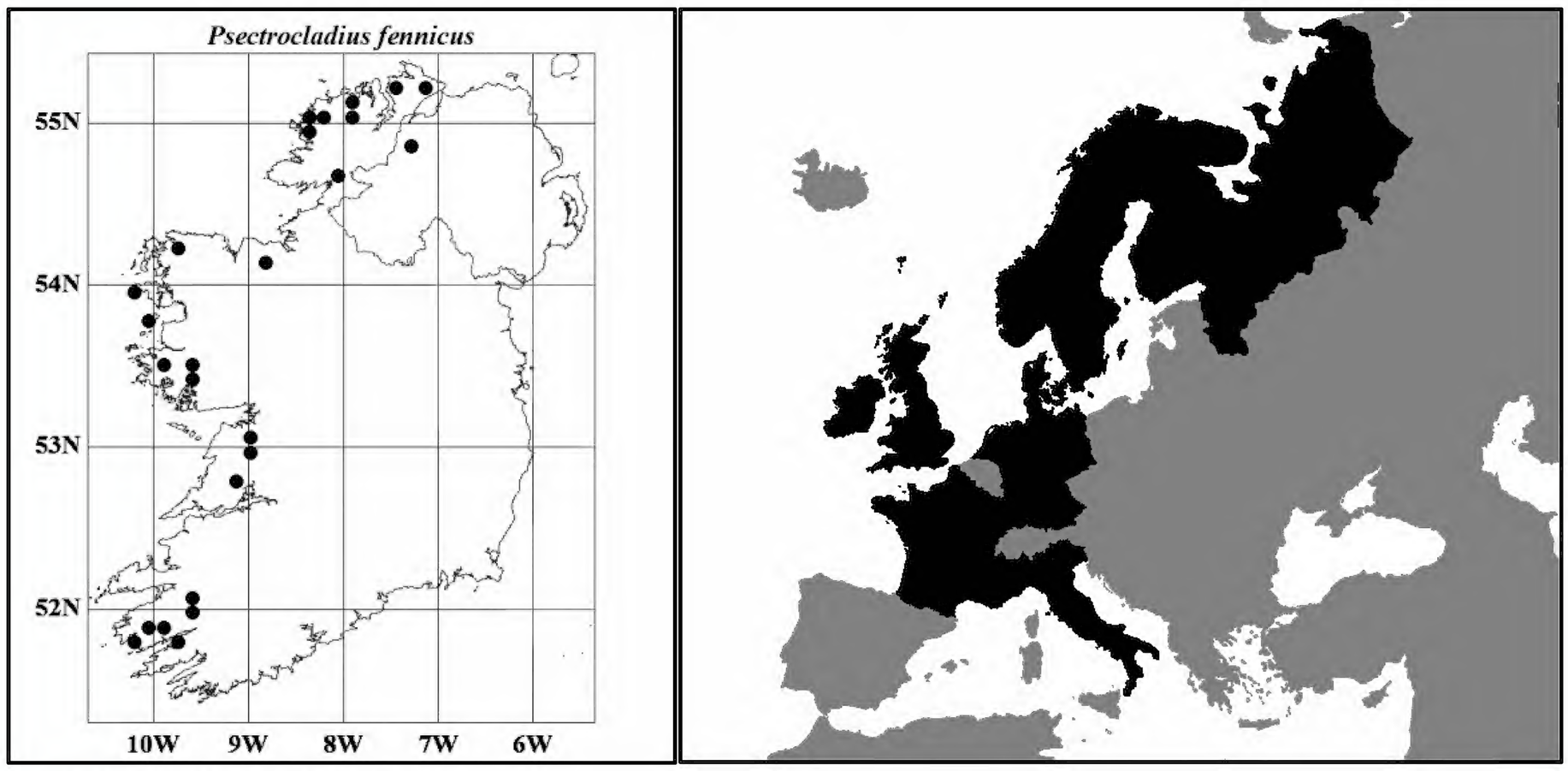
FIGURES 495-496. *Psectrocladius calcaratus* (Edwards, 1929).



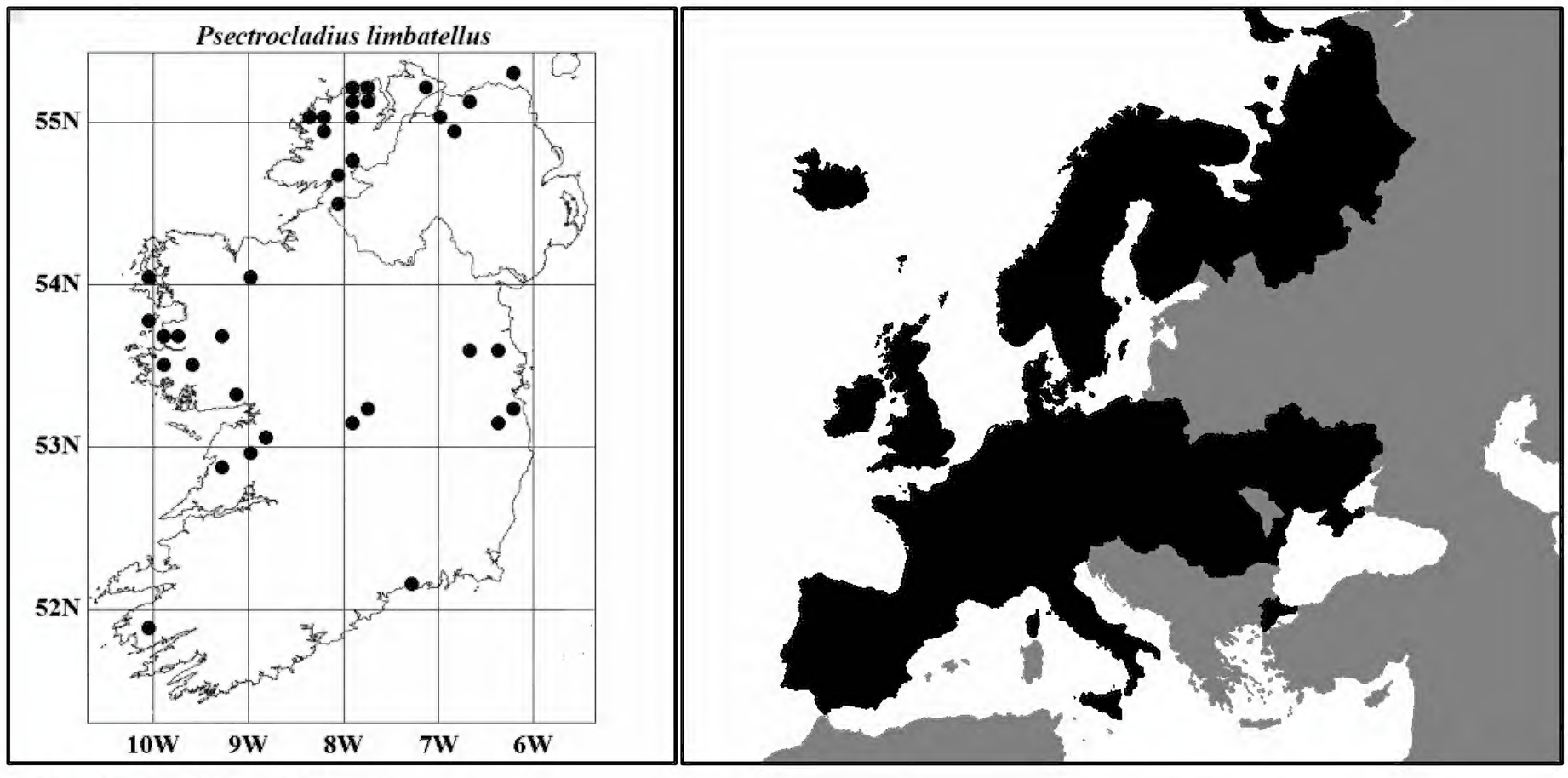
FIGURES 497-498. *Psectrocladius barbimanus* (Edwards, 1929).



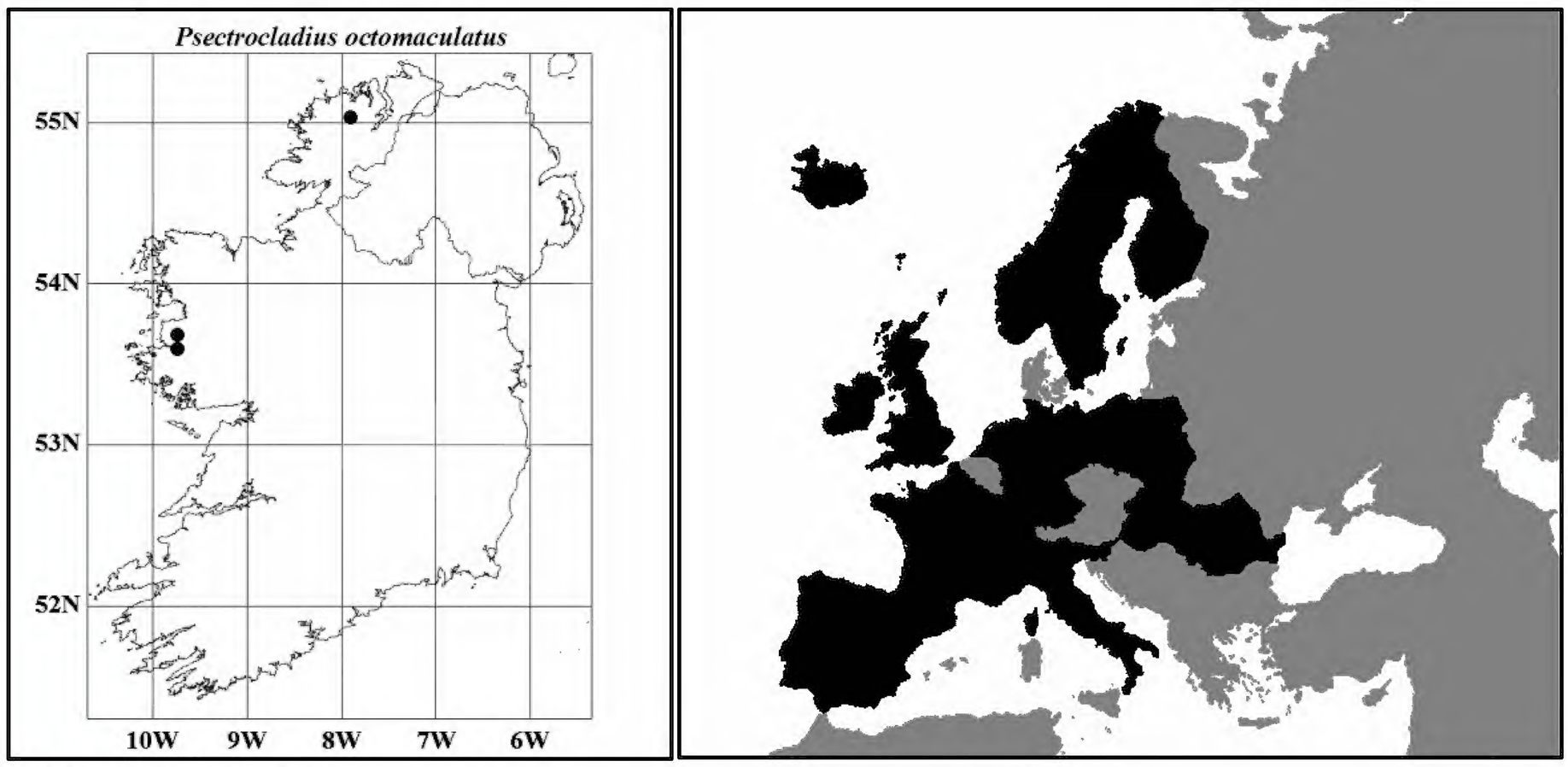
FIGURES 499-500. *Psectrocladius bisetus* Goetghebuer, 1942.



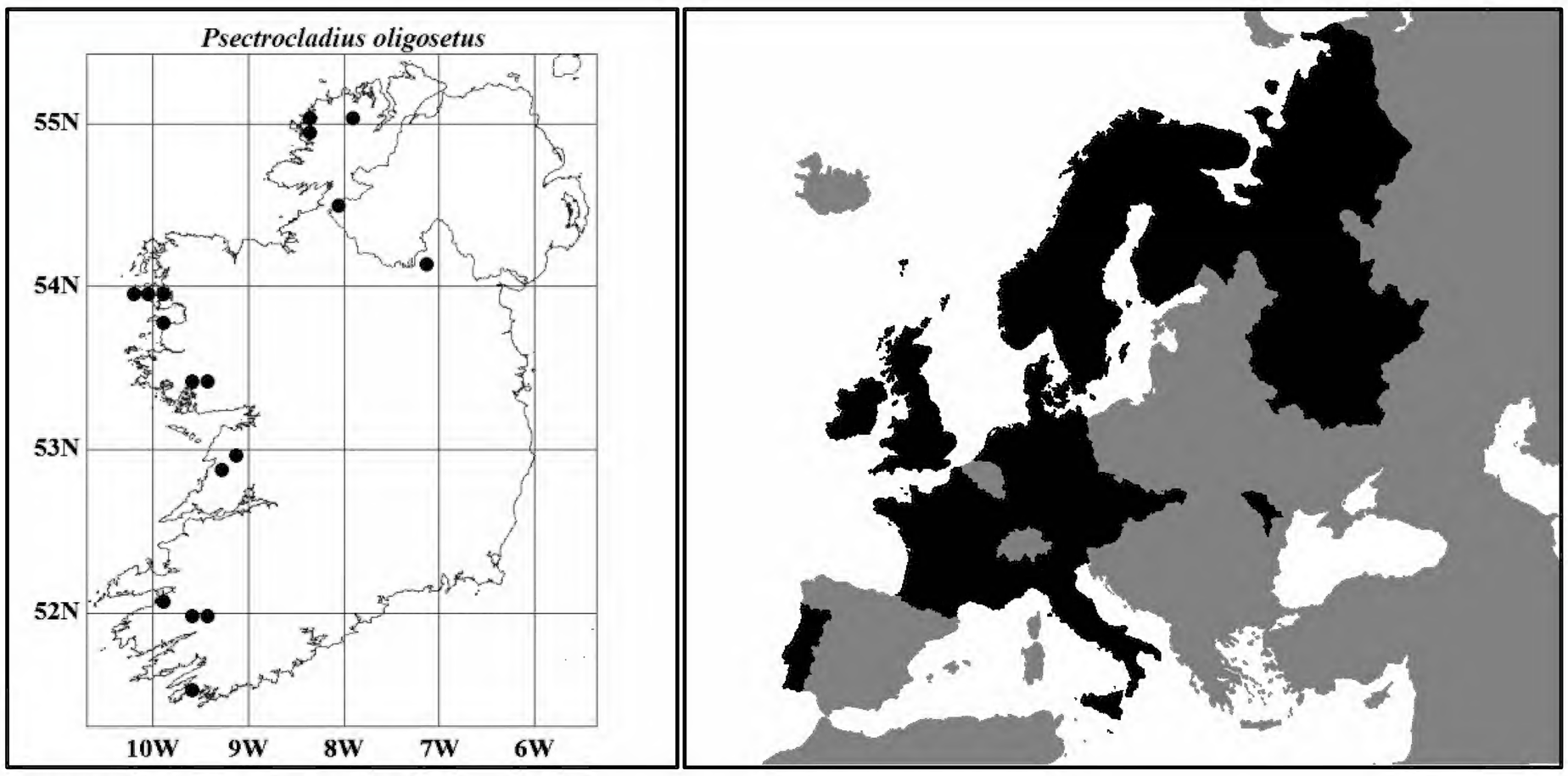
FIGURES 501-502. *Psectrocladius fennicus* Storä, 1939.



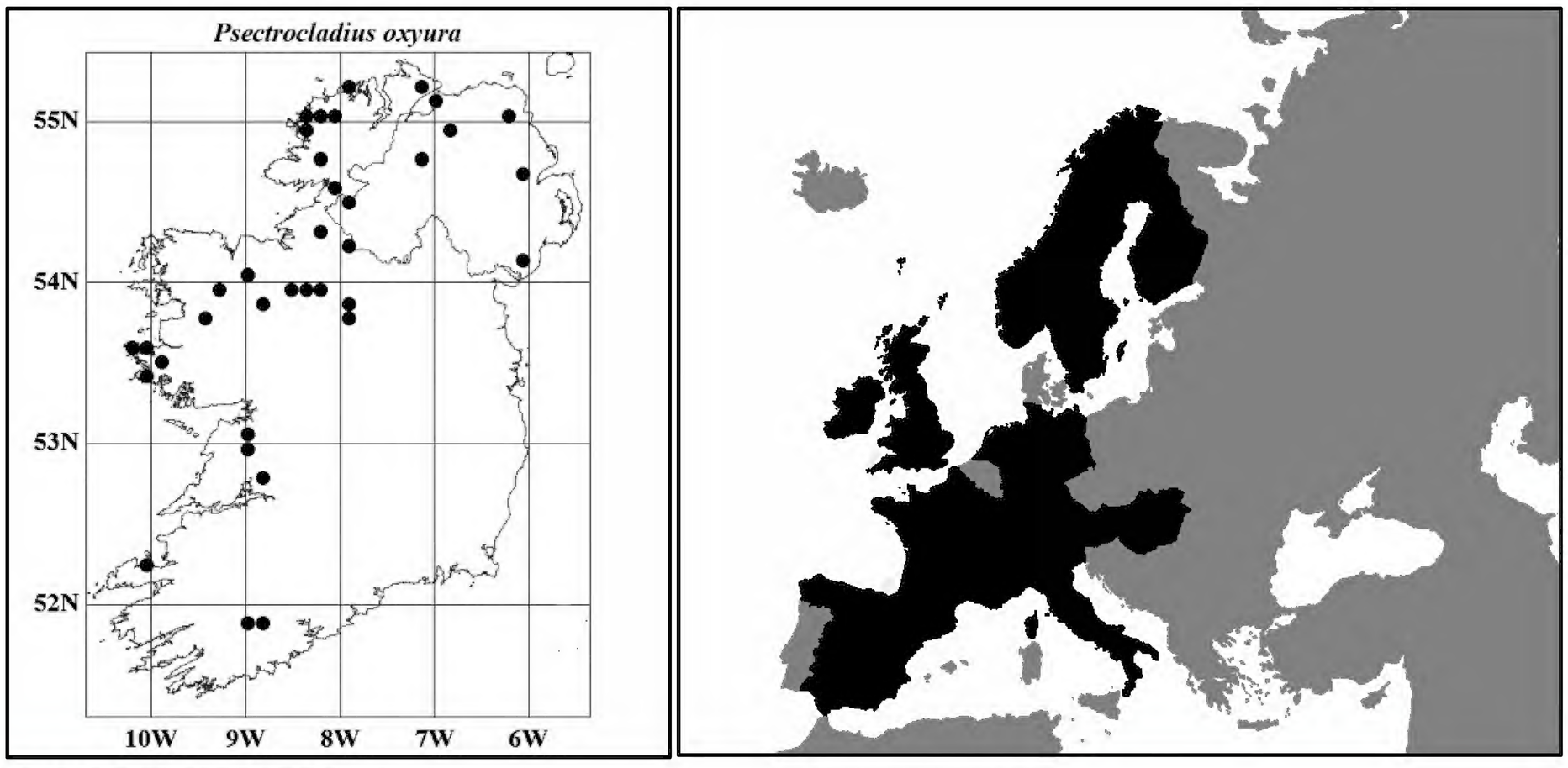
FIGURES 503-504. *Psectrocladius limbatellus* (Holmgren, 1869).



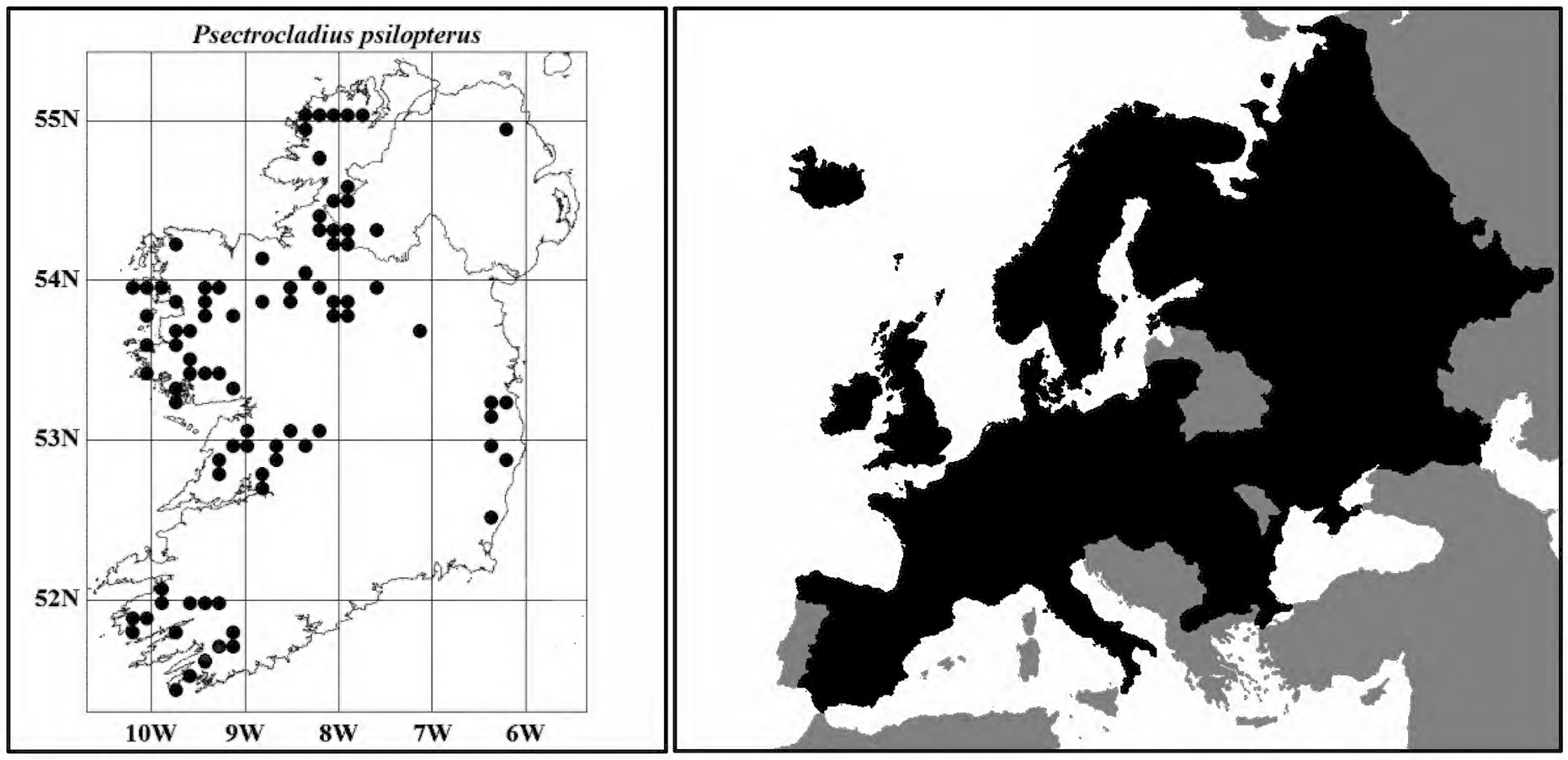
FIGURES 505-506. *Psectrocladius octomaculatus* Wülker, 1956.



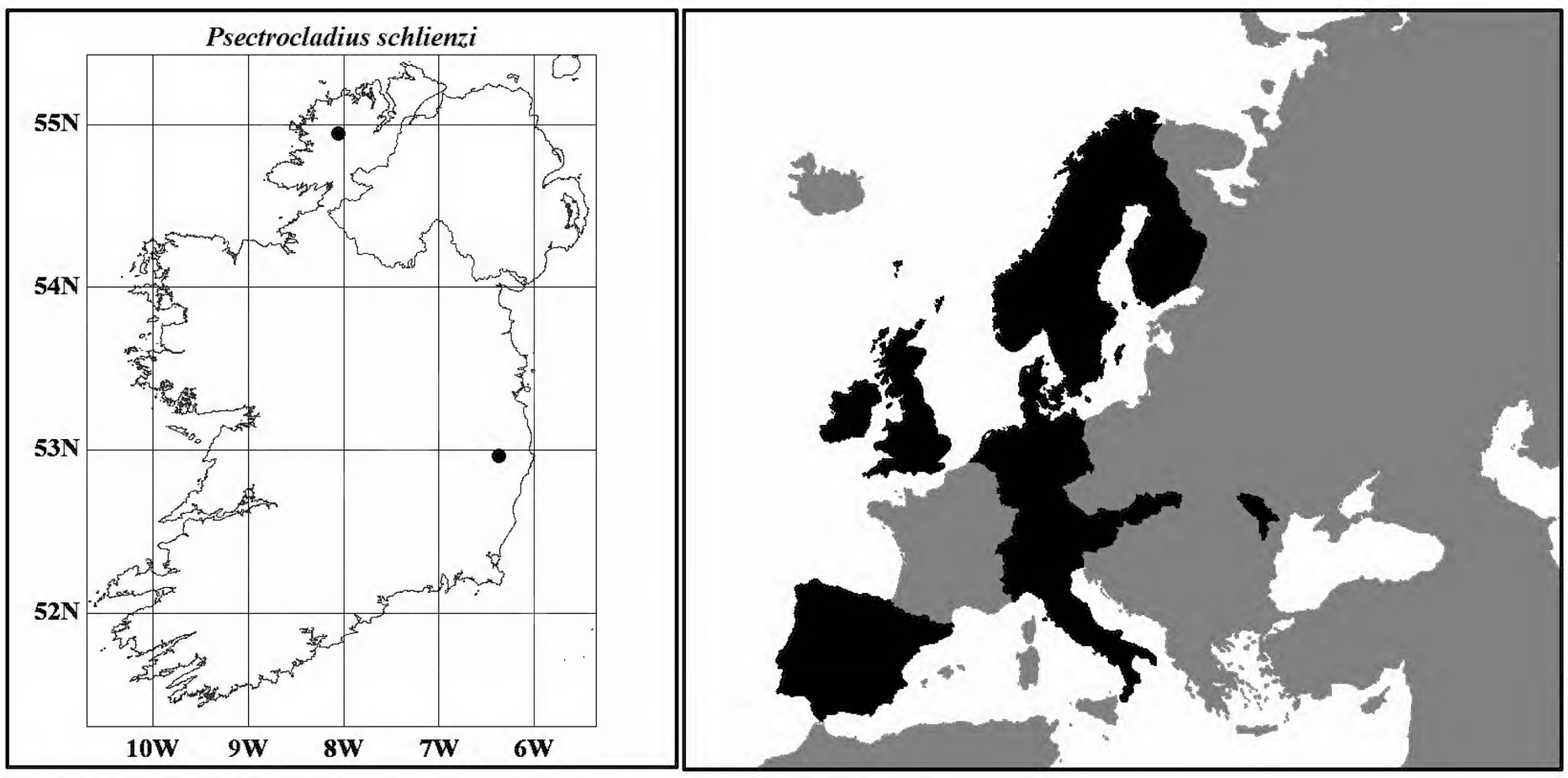
FIGURES 507-508. *Psectrocladius oligosetus* Wülker, 1956.



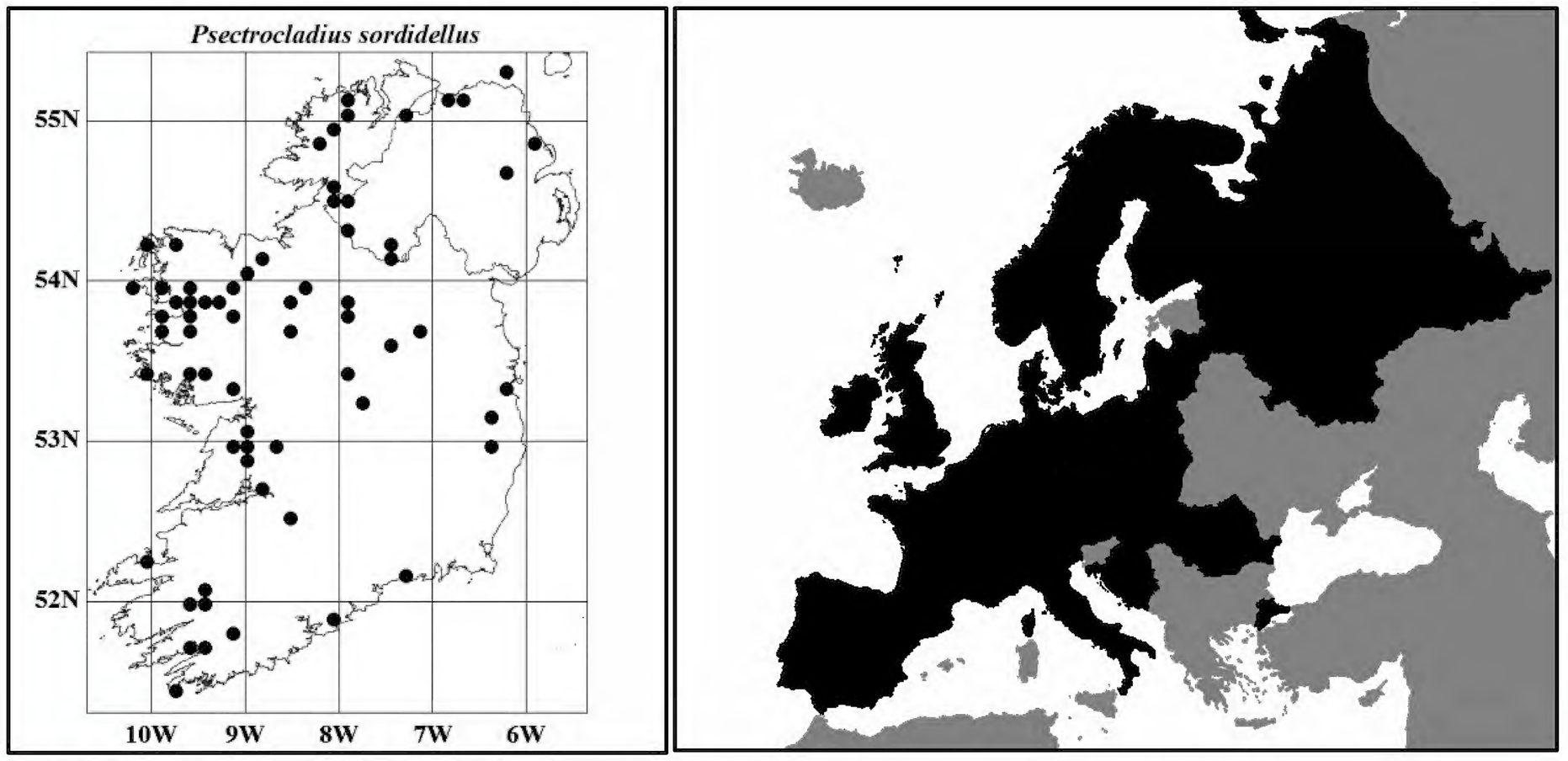
FIGURES 509-510. *Psectrocladius oxyura* Langton, 1985.



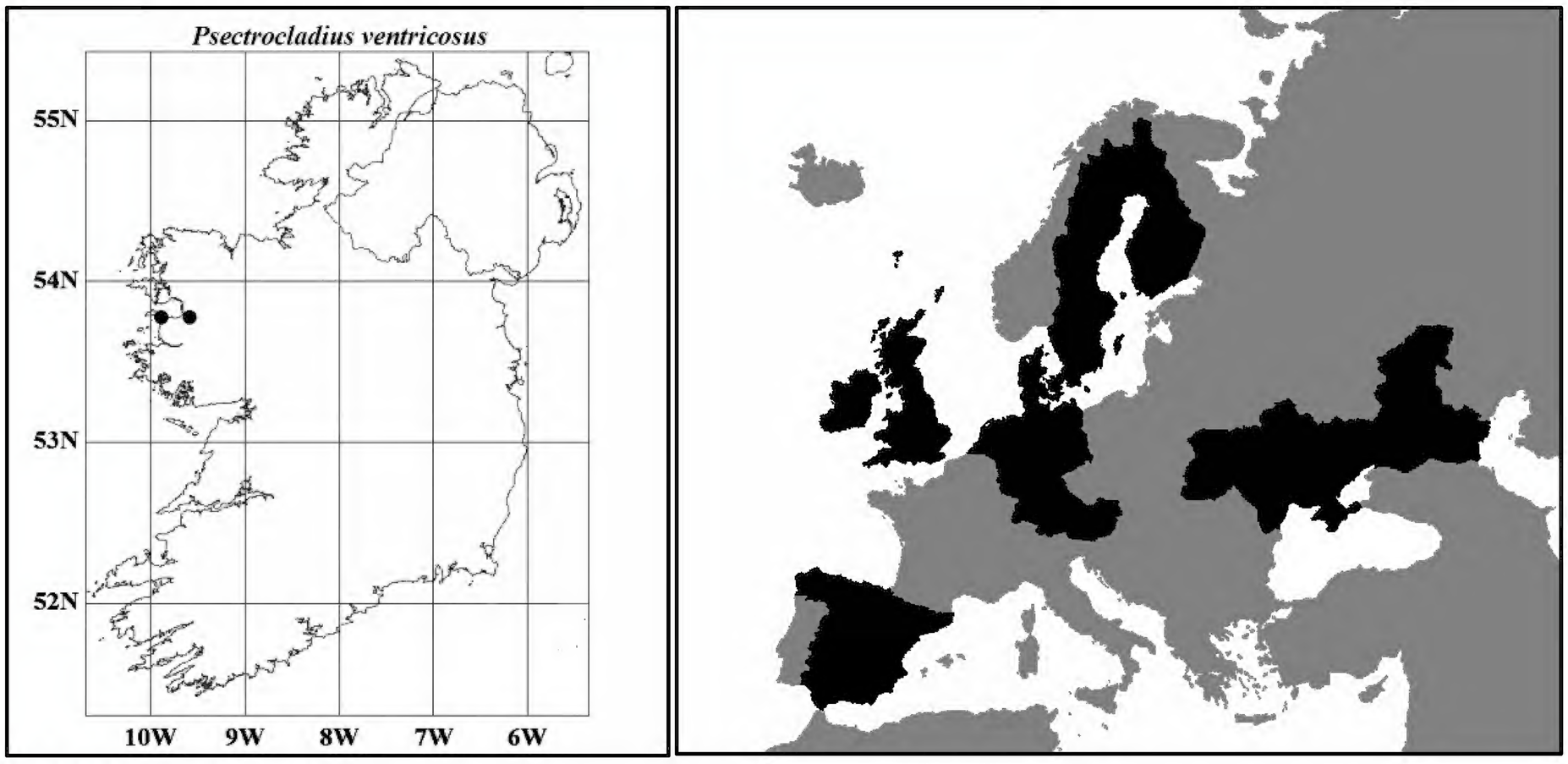
FIGURES 511-512. *Psectrocladius psilopterus* (Kieffer, 1906).



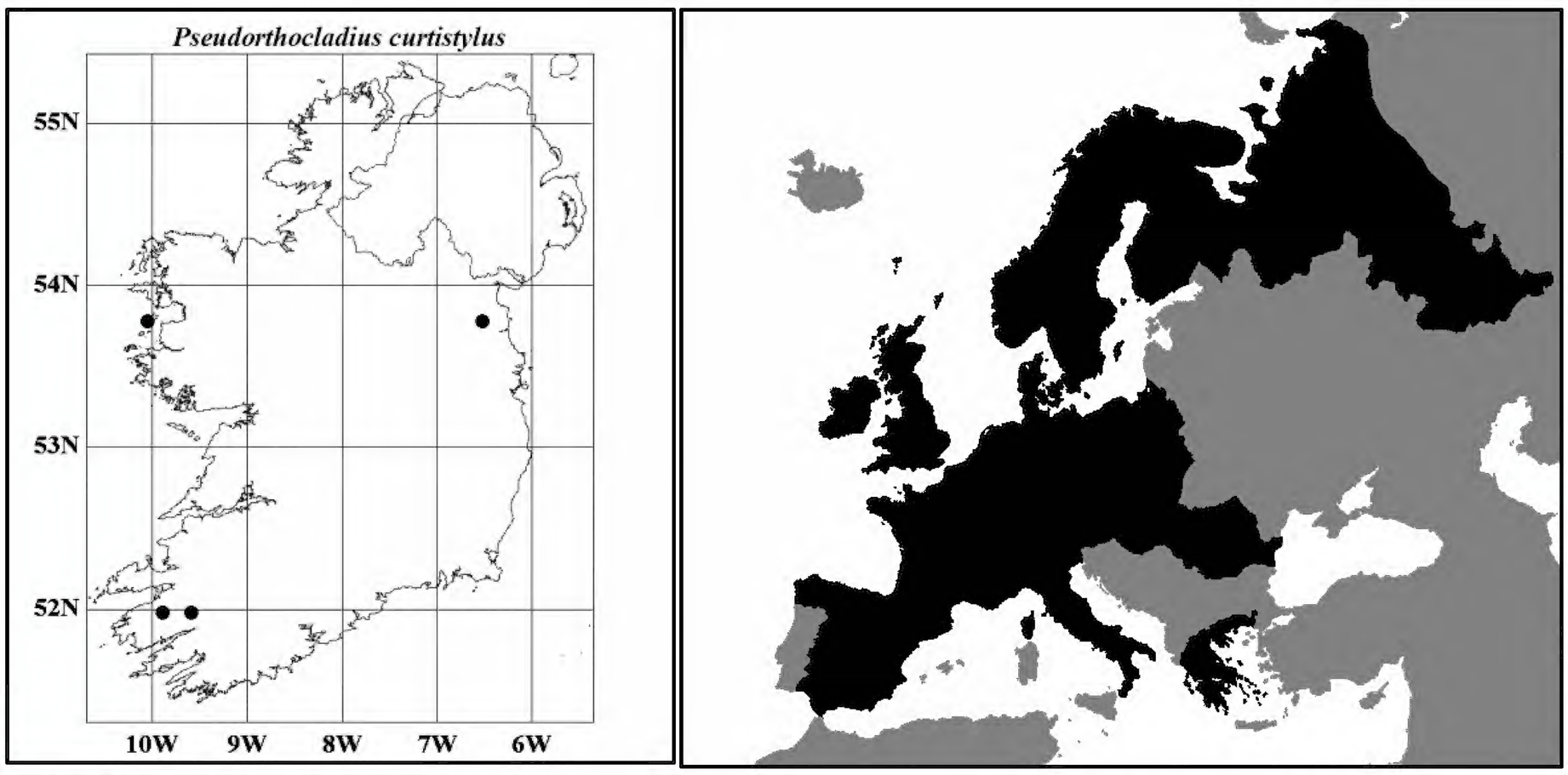
FIGURES 513-514. *Psectrocladius schlienzi* Wülker, 1956.



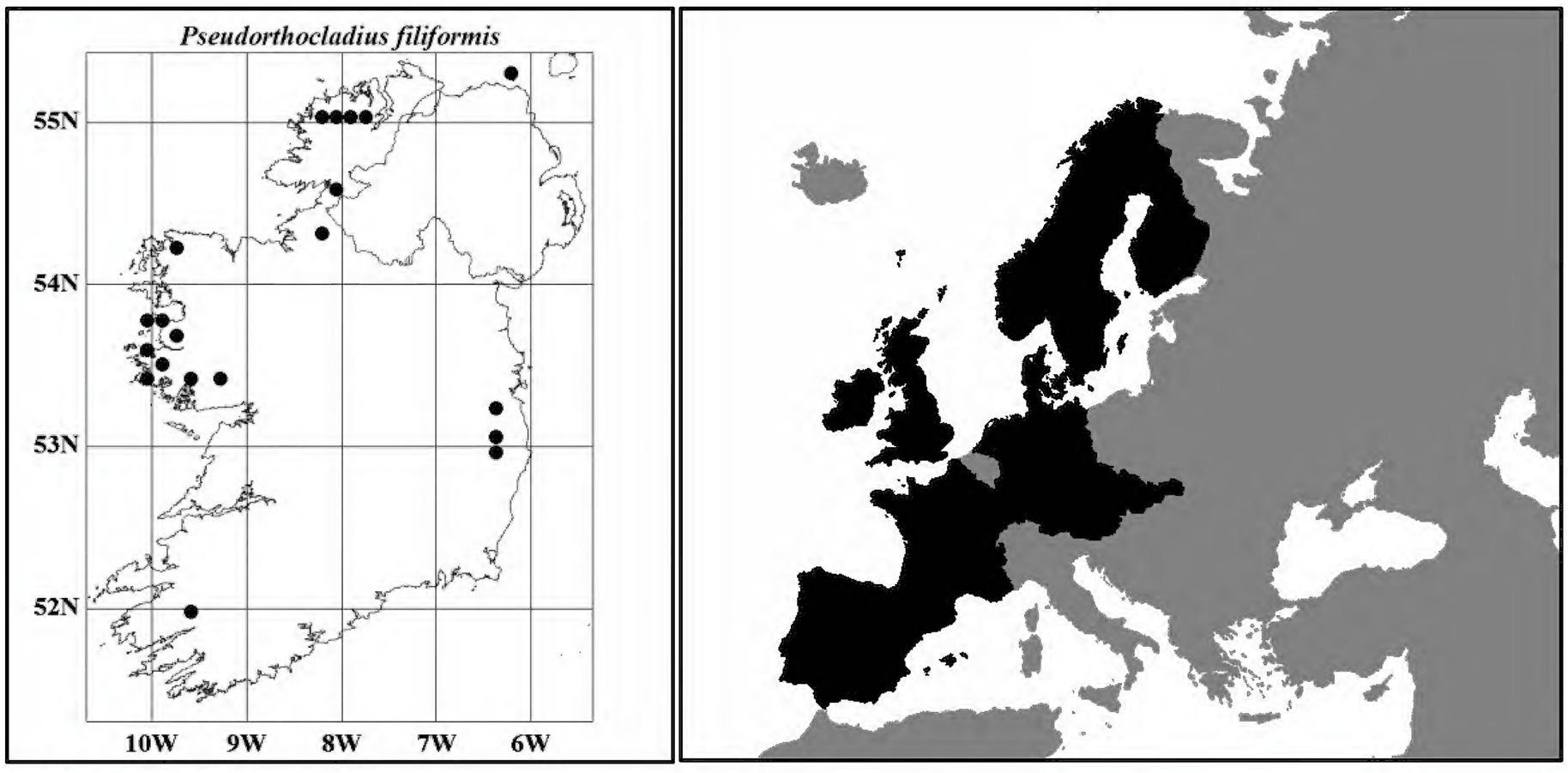
FIGURES 515-516. *Psectrocladius sordidellus* (Zetterstedt, 1838).



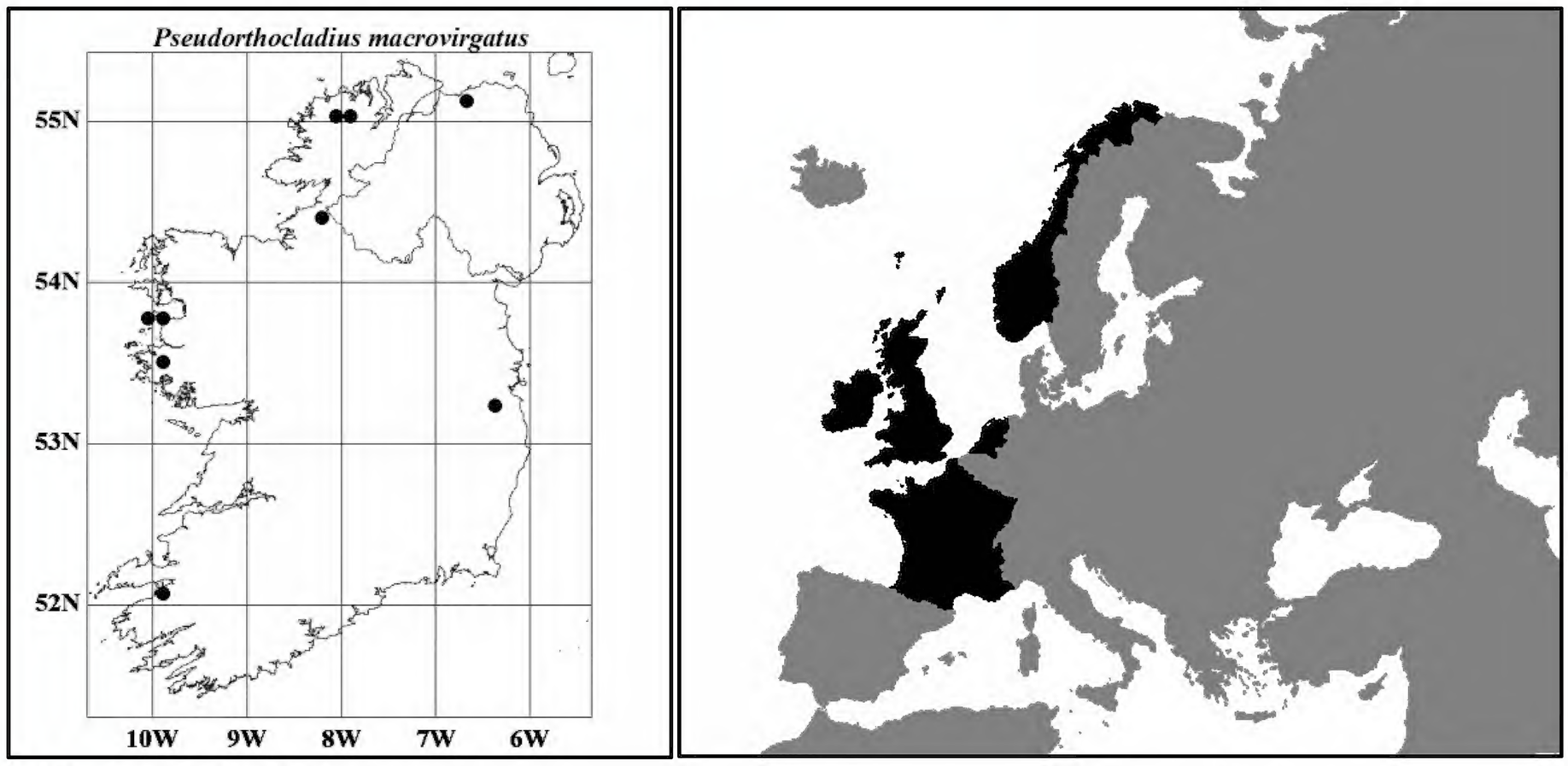
FIGURES 517-518. *Psectrocladius ventricosus* Kieffer, 1925.



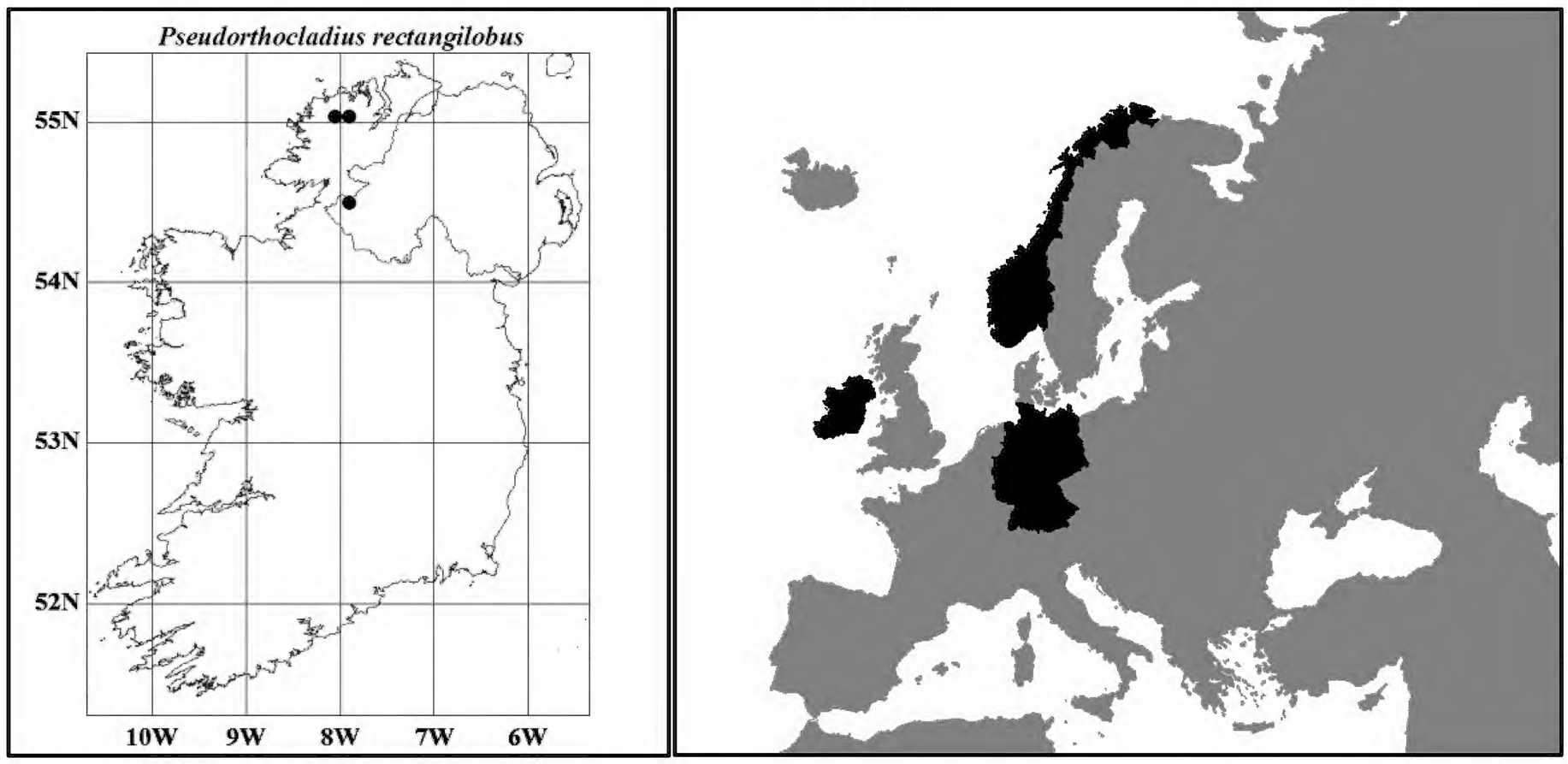
FIGURES 519-520. *Pseudorthocladius curtistylus* (Goetghebuer, 1921).



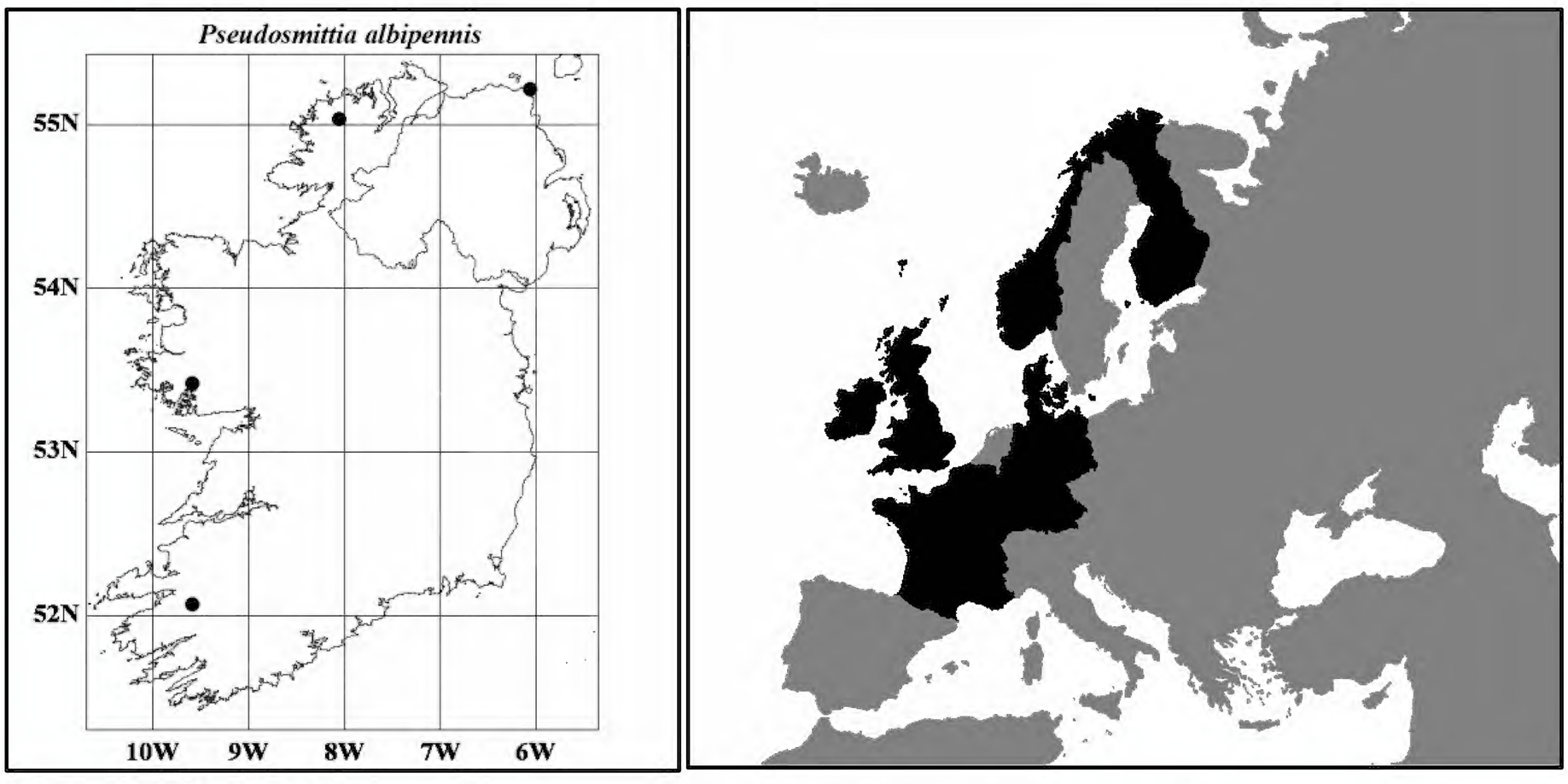
FIGURES 521-522. *Pseudorthocladius filiformis* (Kieffer, 1908).



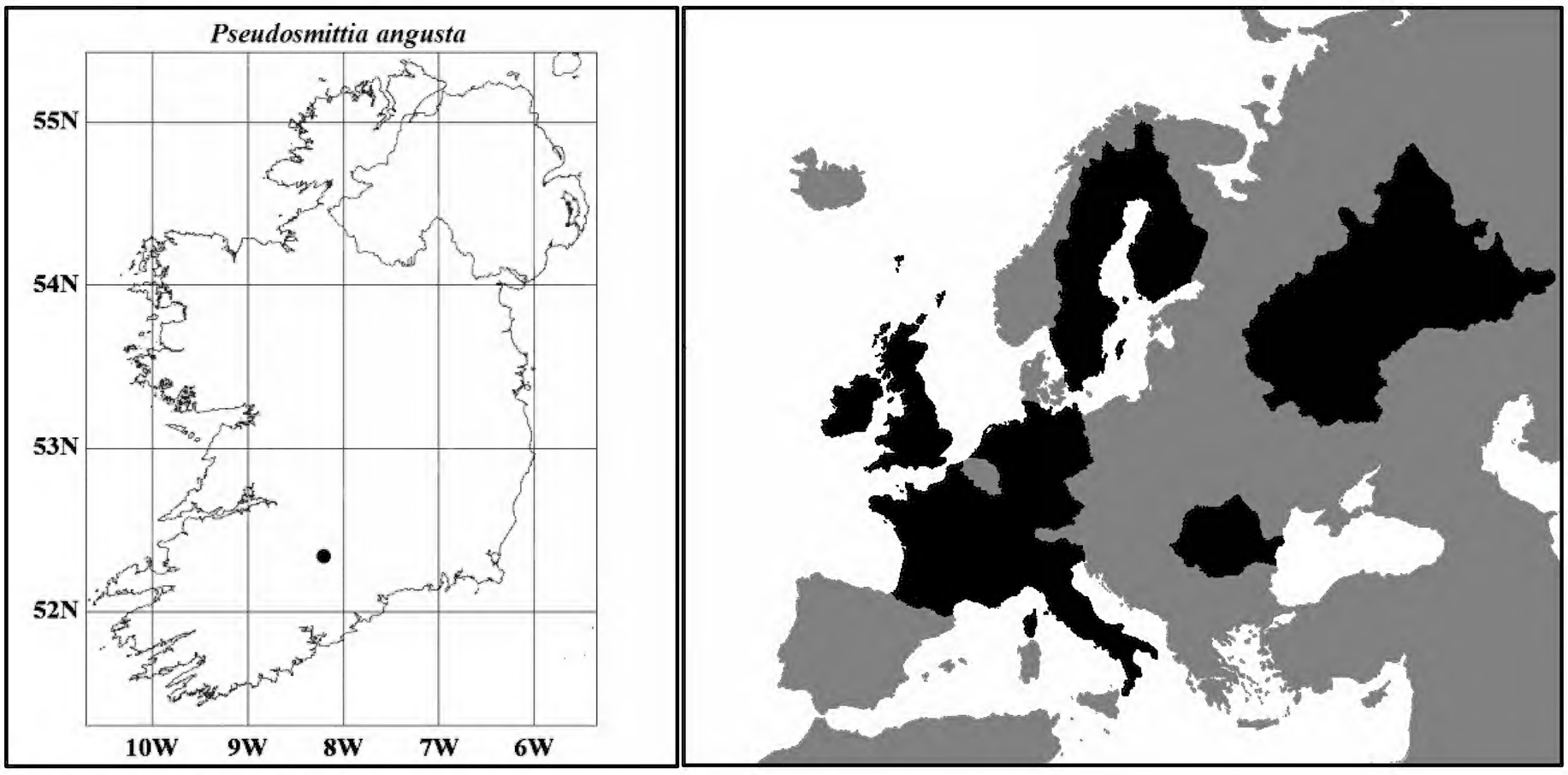
FIGURES 523-524. *Pseudorthocladius macrovirgatus* Sæther & Sublette, 1983.



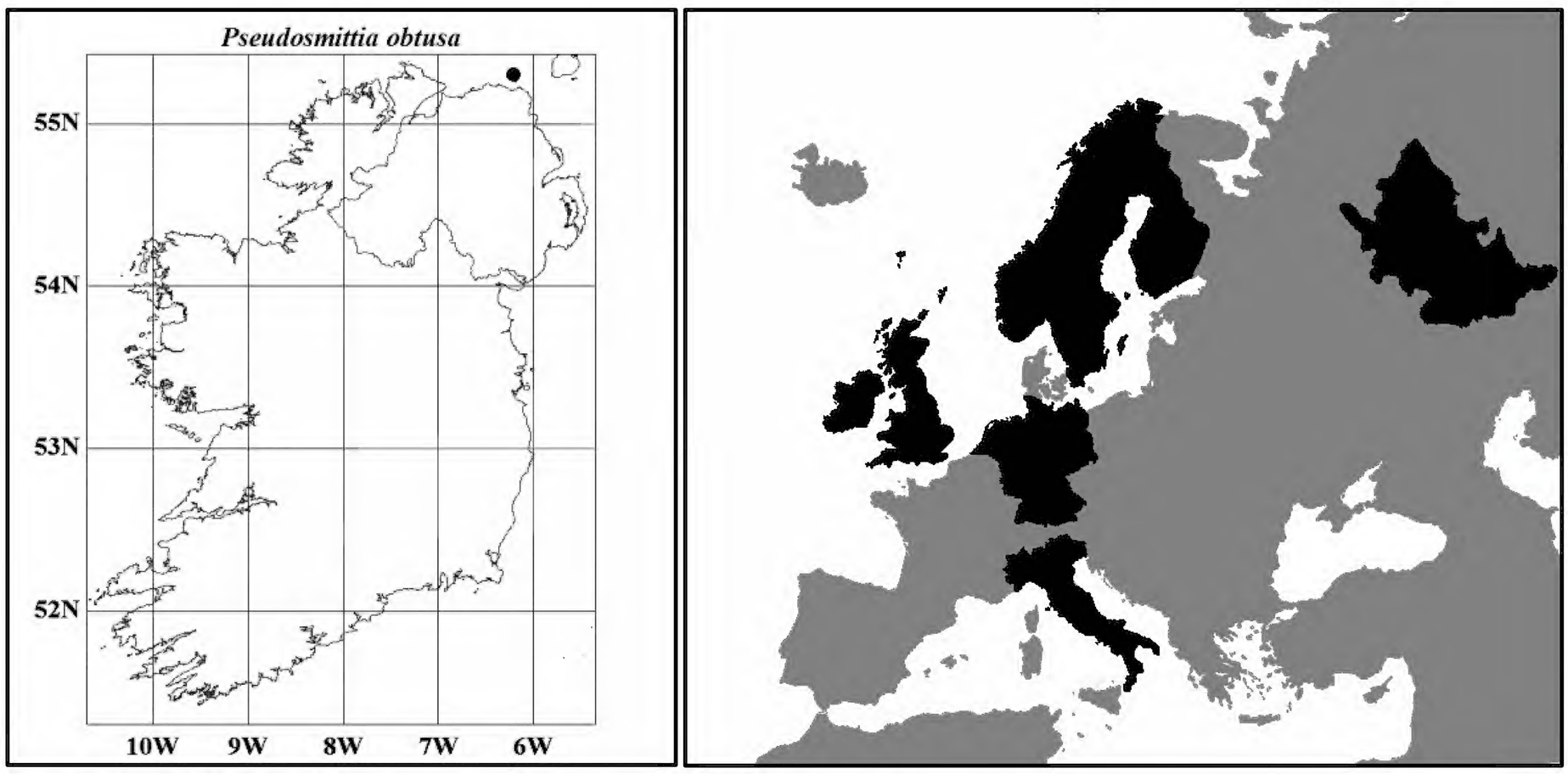
FIGURES 525-526. *Pseudorthocladius rectangilobus* Caspers & Siebert, 1980.



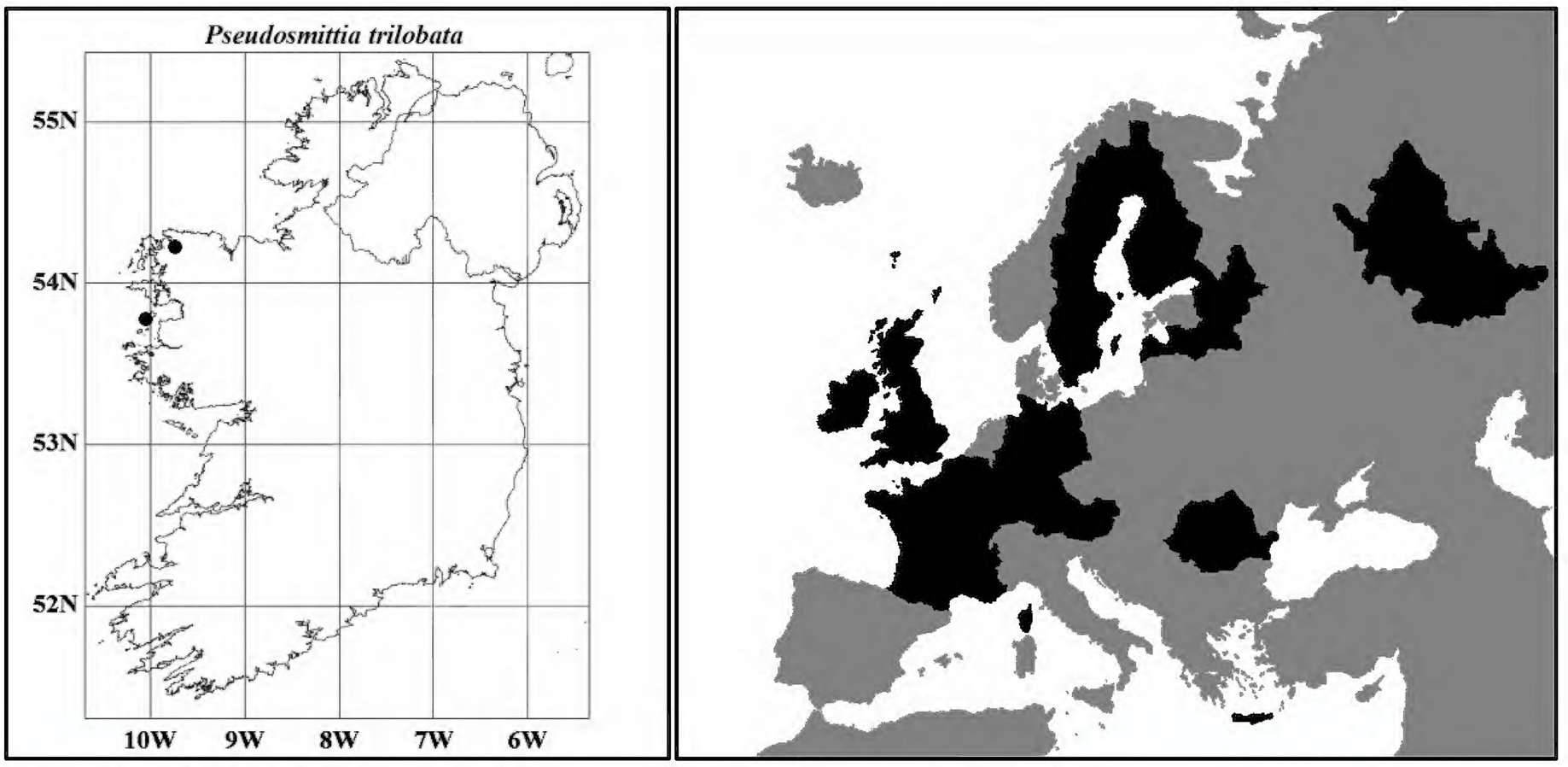
FIGURES 527-528. *Pseudosmittia albipennis* (Goetghebuer, 1921).



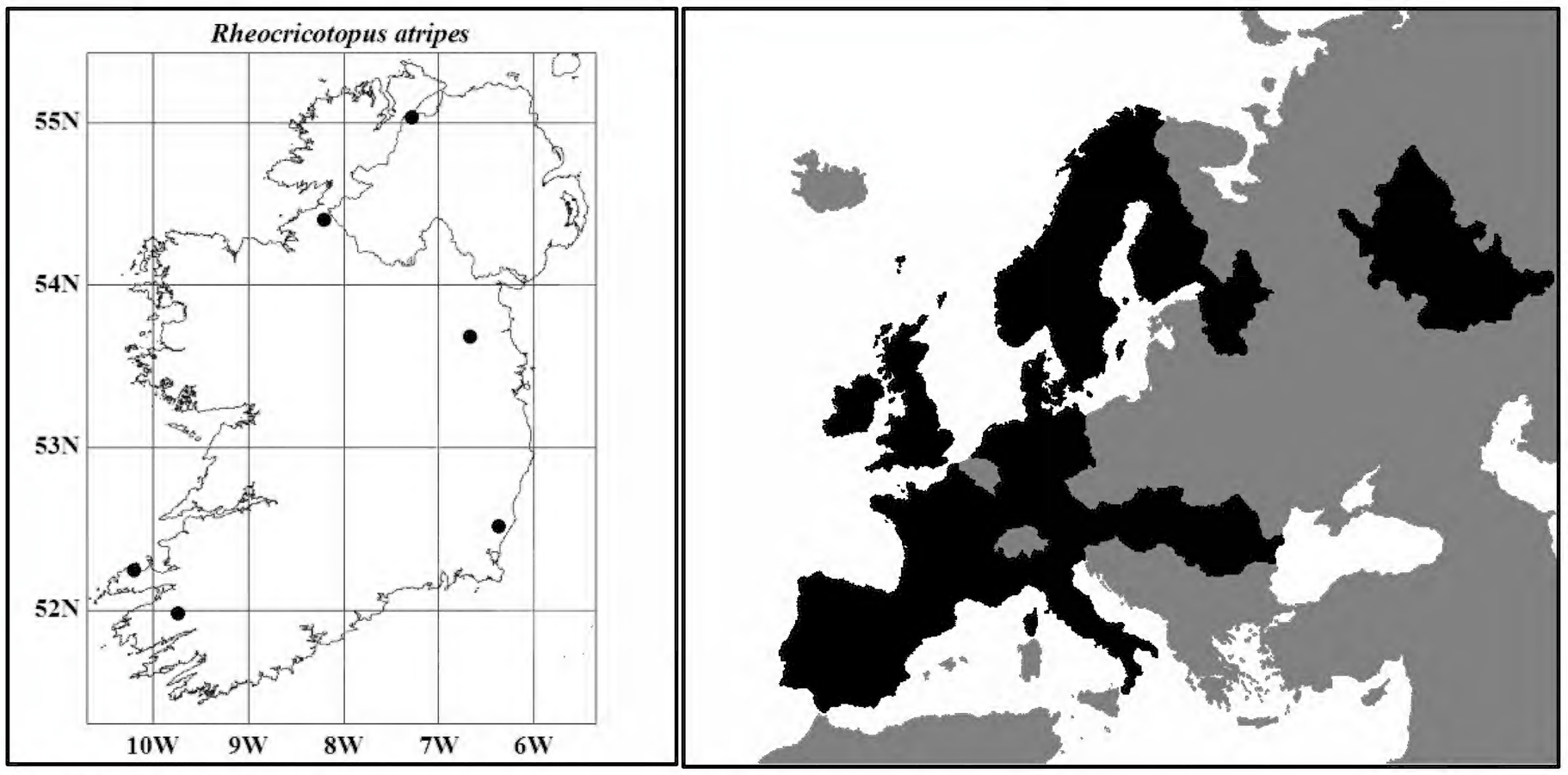
FIGURES 529-530. *Pseudosmittia angusta* (Edwards, 1929).



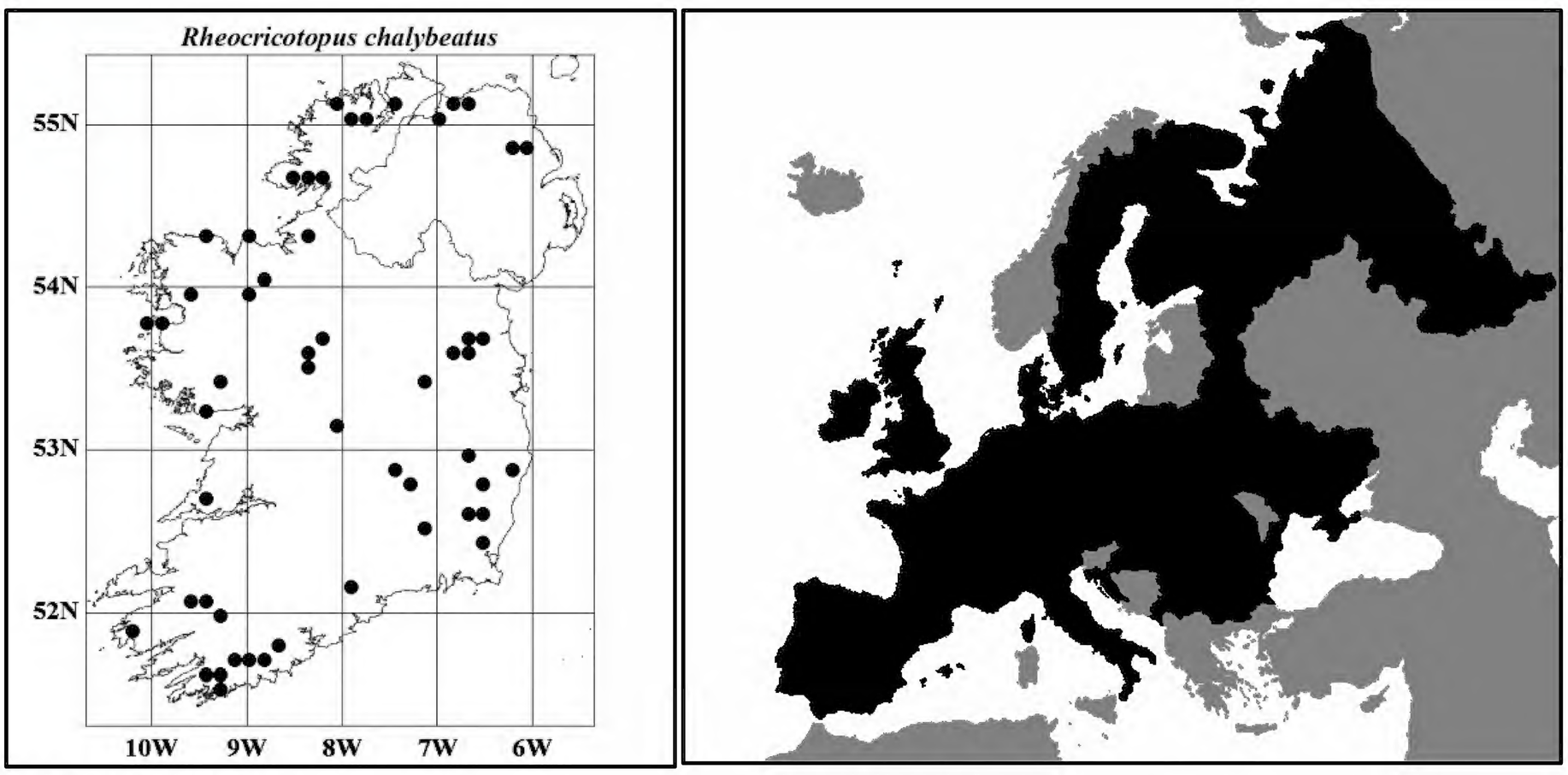
FIGURES 531-532. *Pseudosmittia obtusa* Strenzke, 1960.



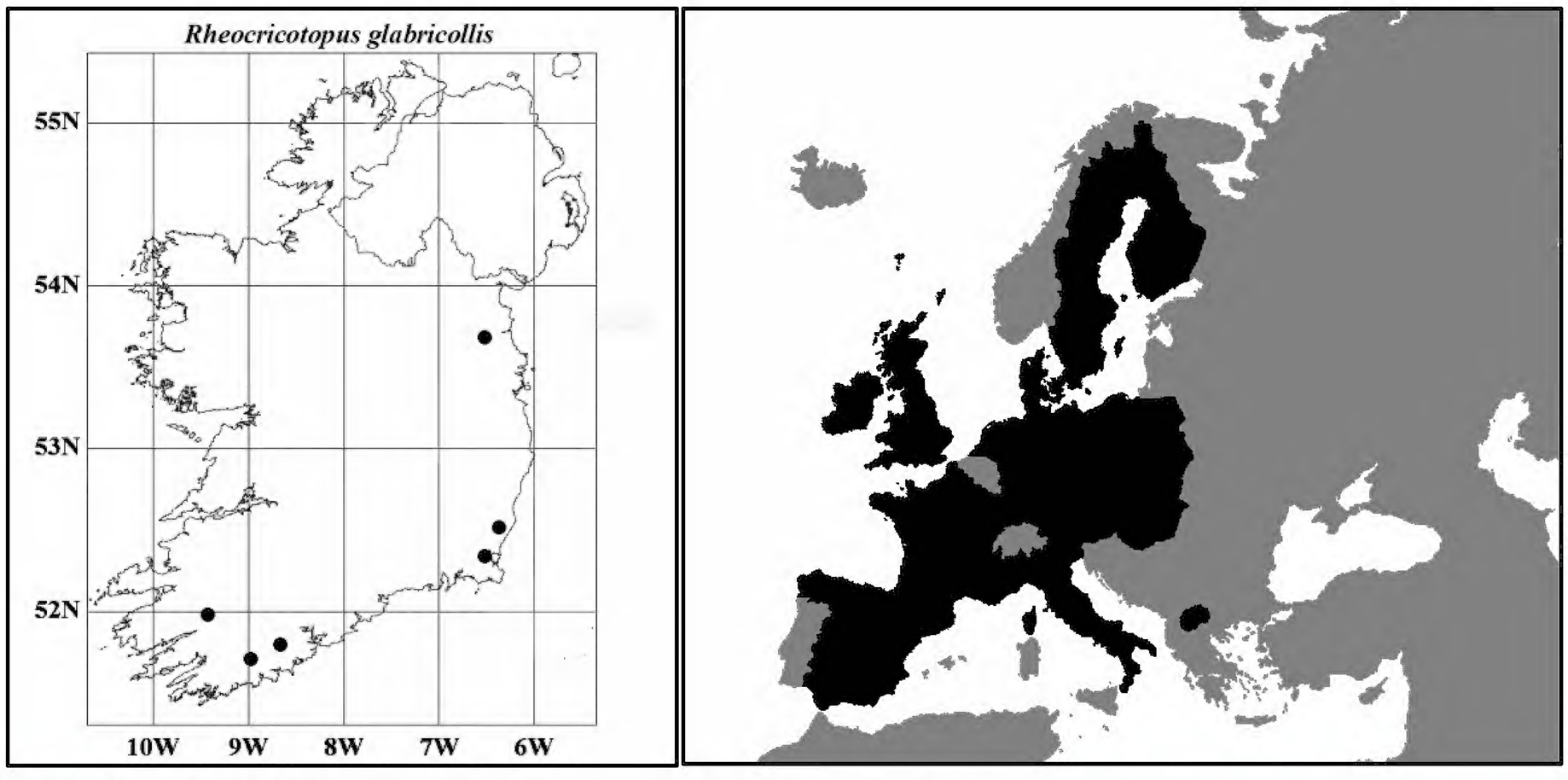
FIGURES 533-534. *Pseudosmittia trilobata* (Edwards, 1929).



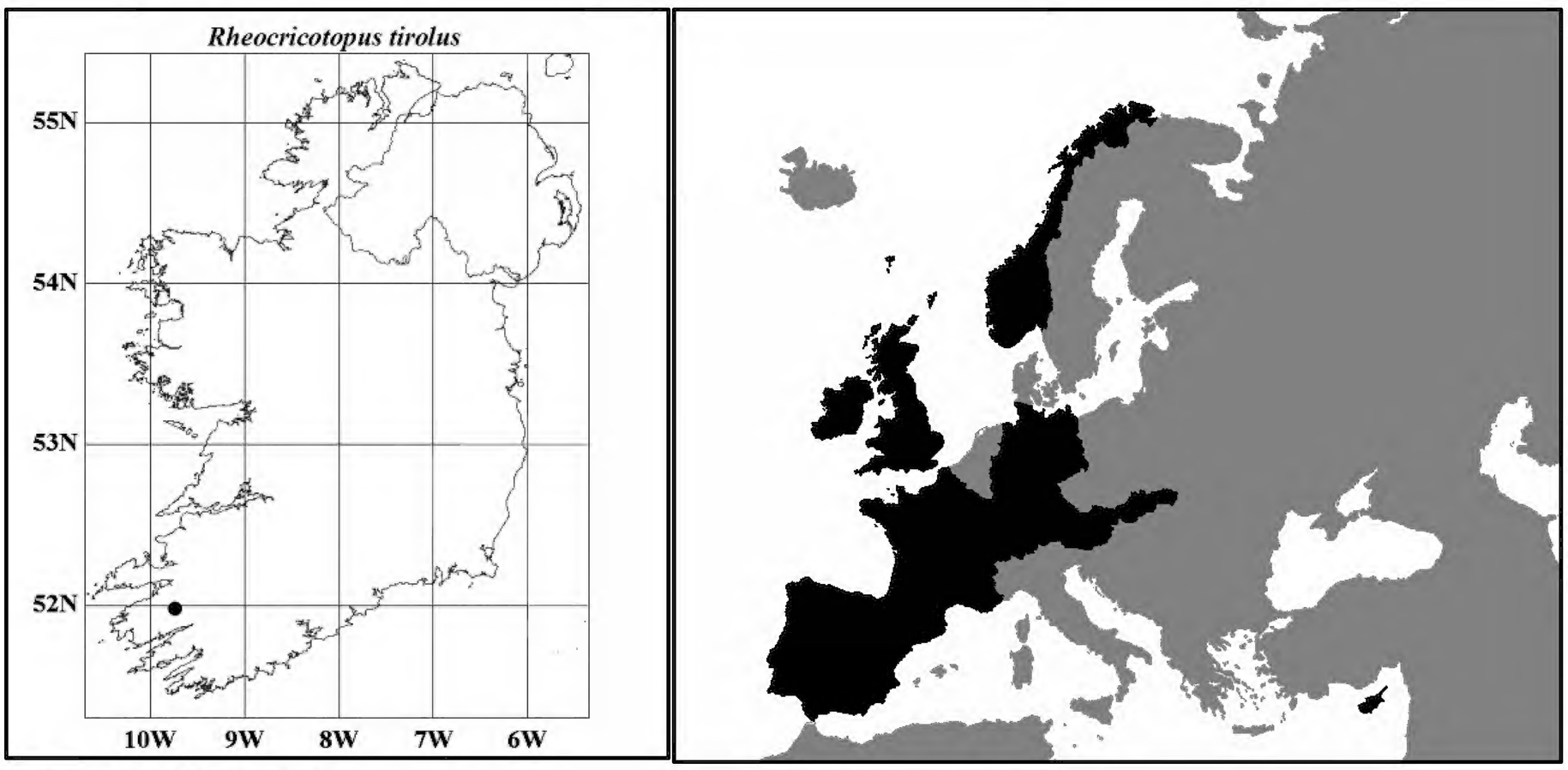
FIGURES 535-536. *Rheocricotopus atripes* (Kieffer, 1913).



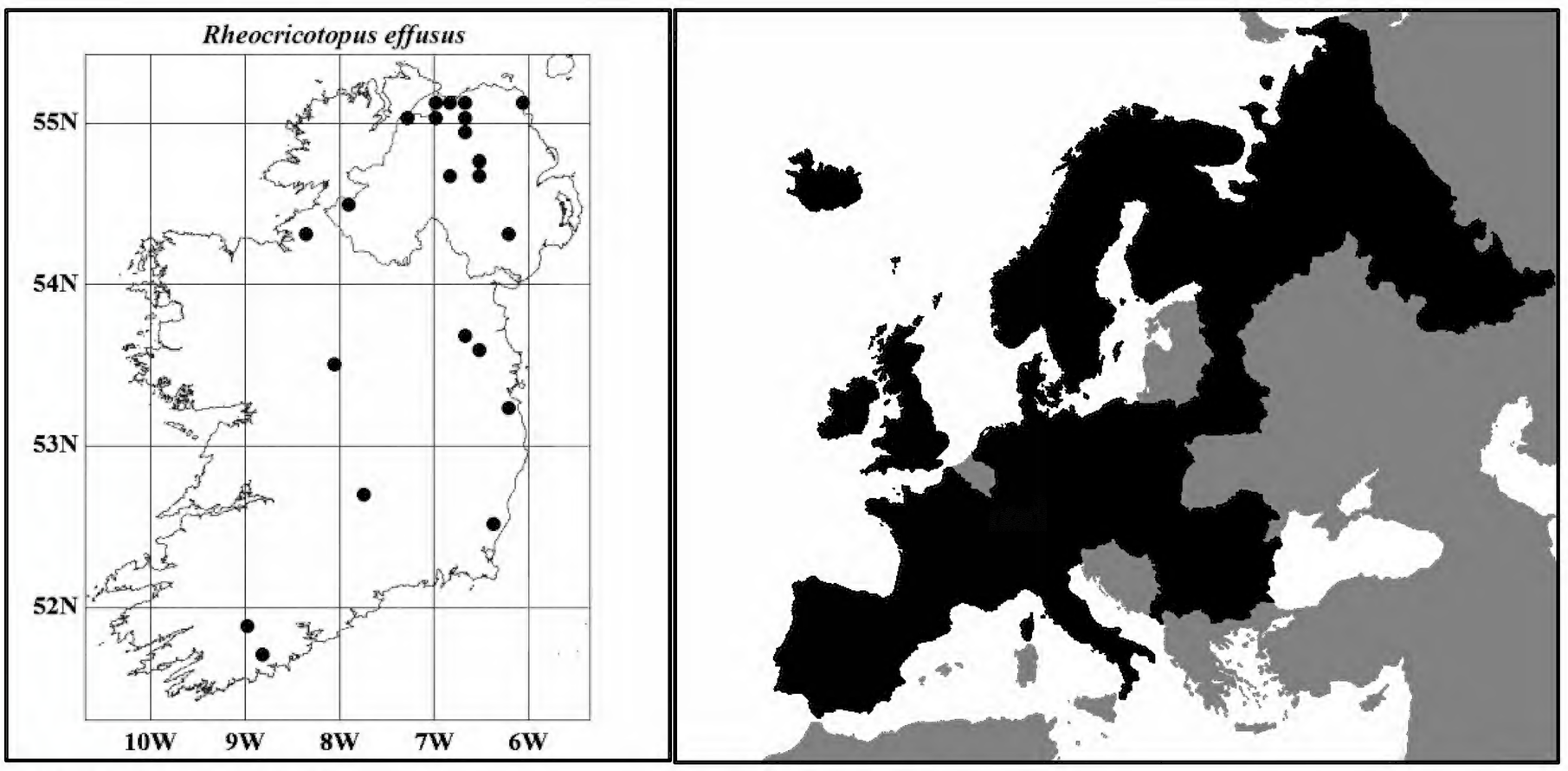
FIGURES 537-538. *Rheocricotopus chalybeatus* (Edwards, 1929).



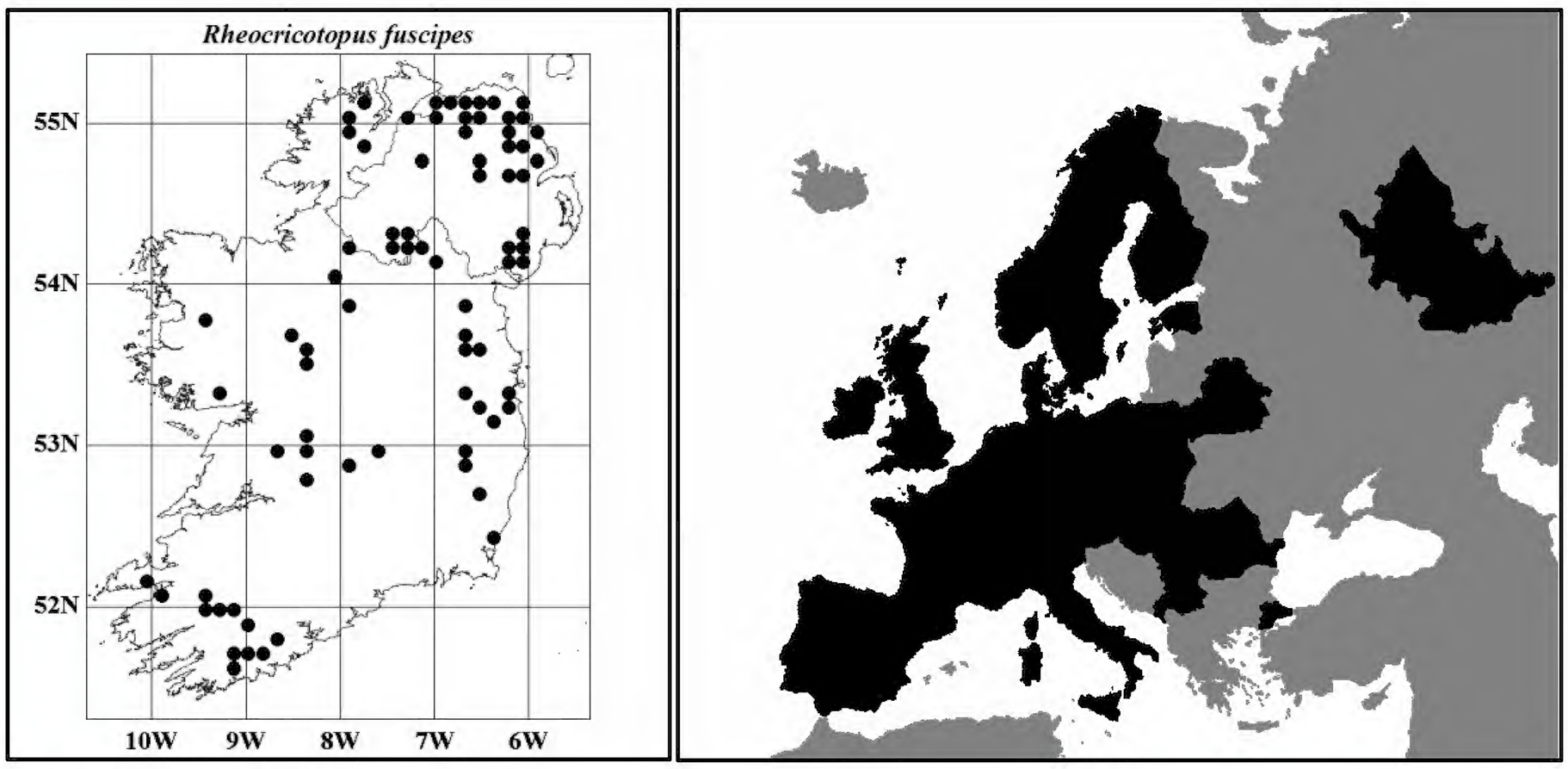
FIGURES 539-540. *Rheocricotopus glabricollis* (Meigen, 1830).



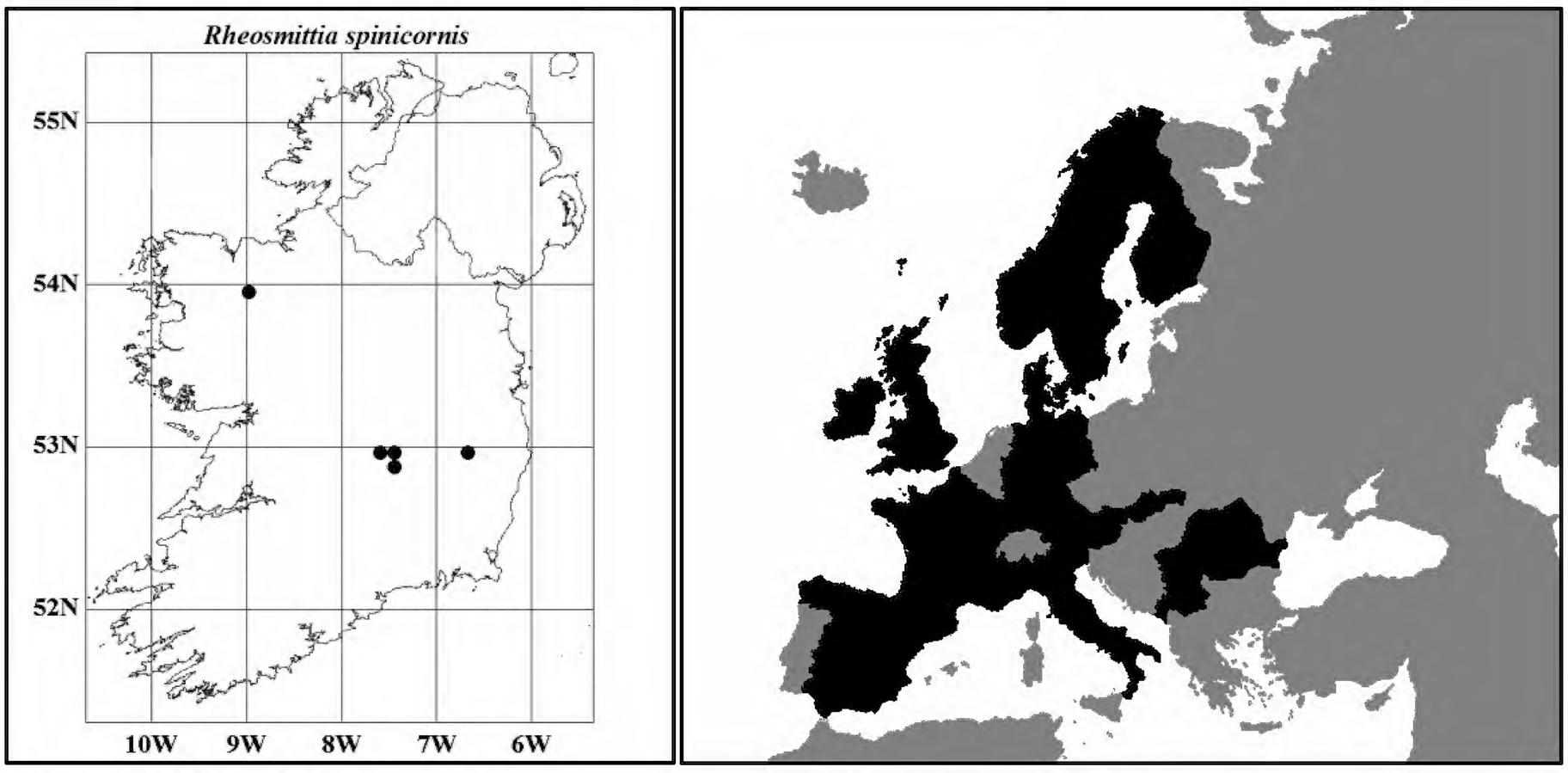
FIGURES 541-542. *Rheocricotopus tirolus* Lehmann, 1969.



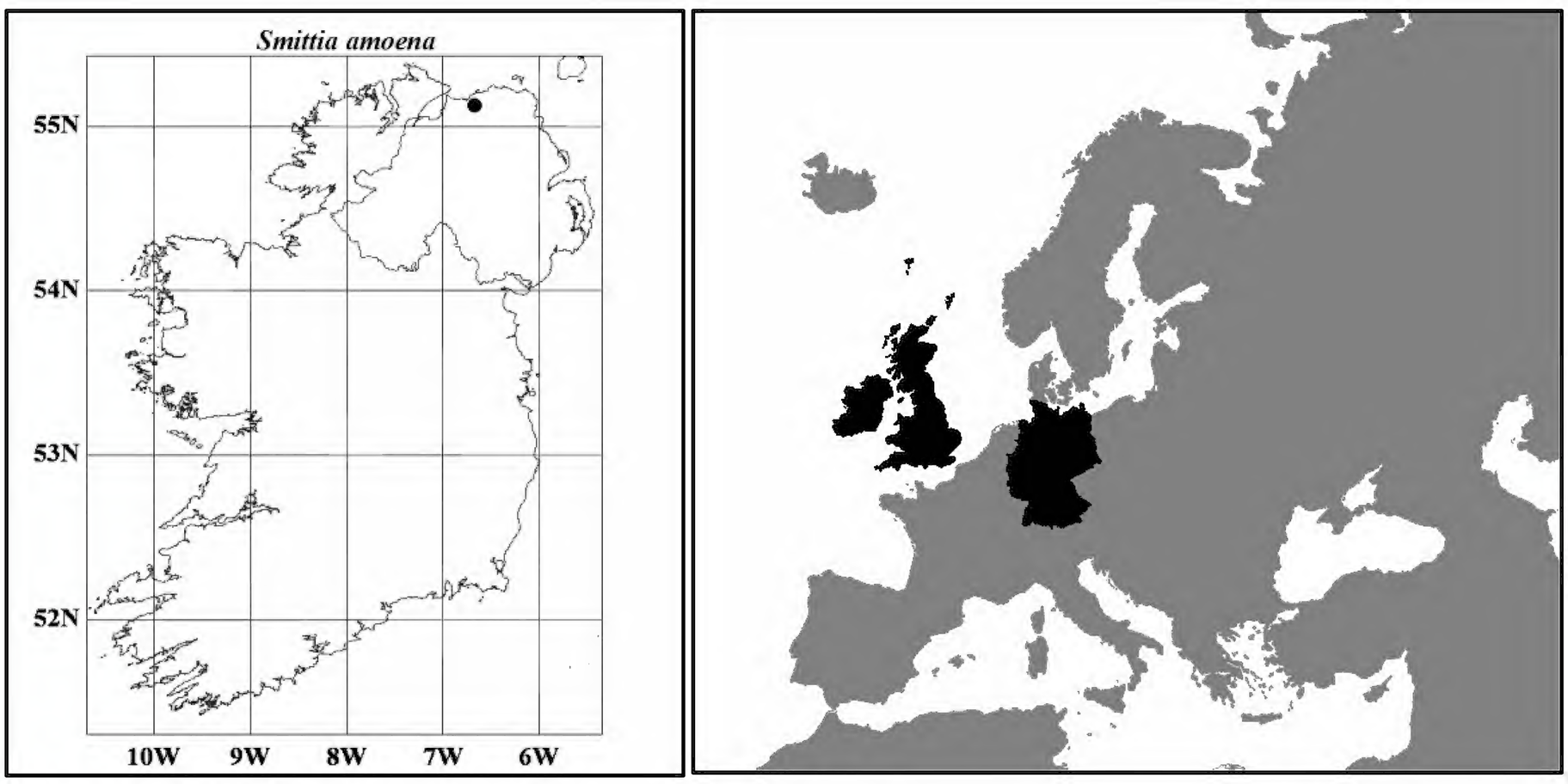
FIGURES 543-544. *Rheocricotopus effusus* (Walker, 1856).



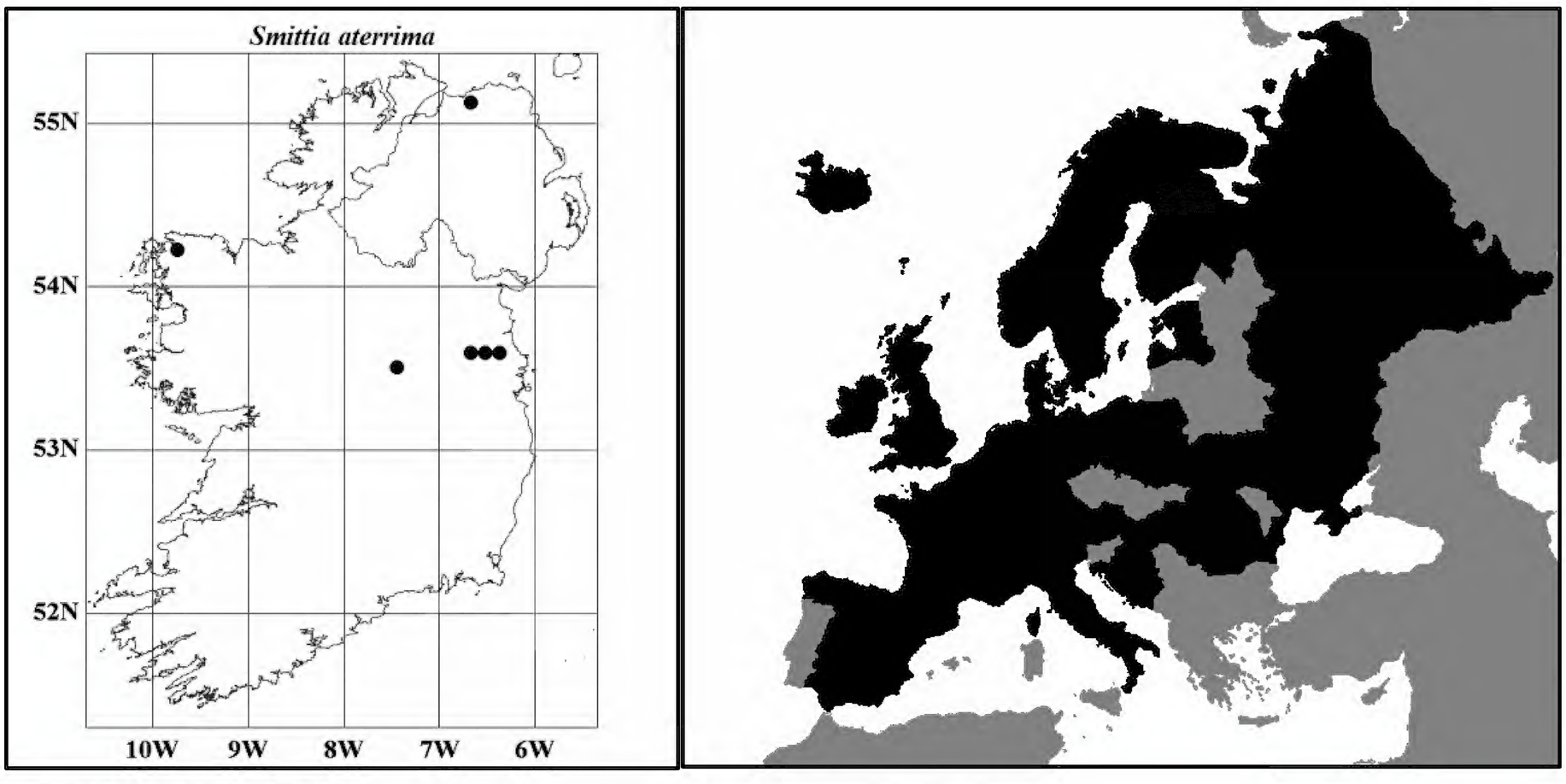
FIGURES 545-546. *Rheocricotopus fuscipes* (Kieffer, 1909).



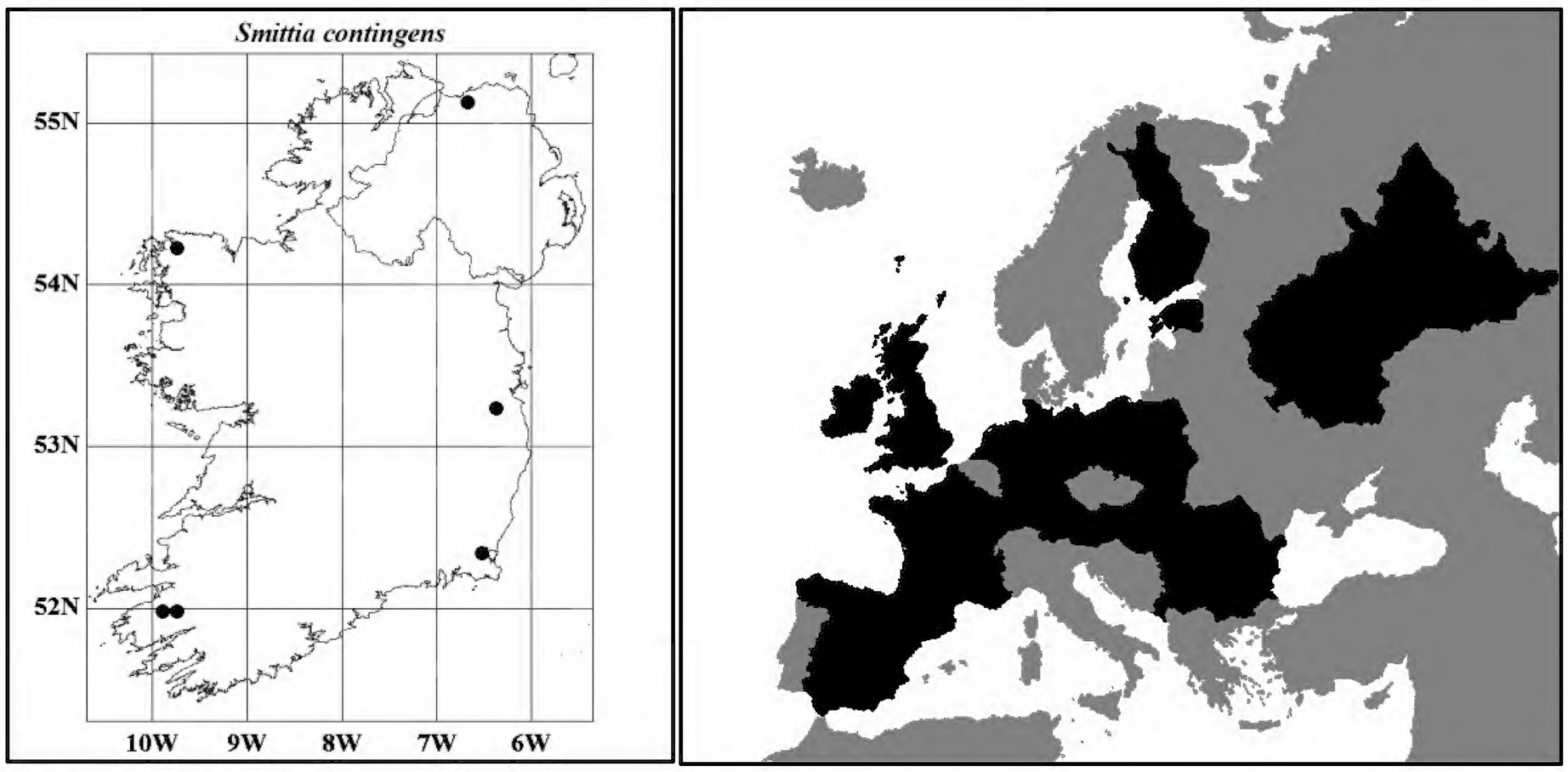
FIGURES 547-548. *Rheosmittia spinicornis* (Brundin, 1956).



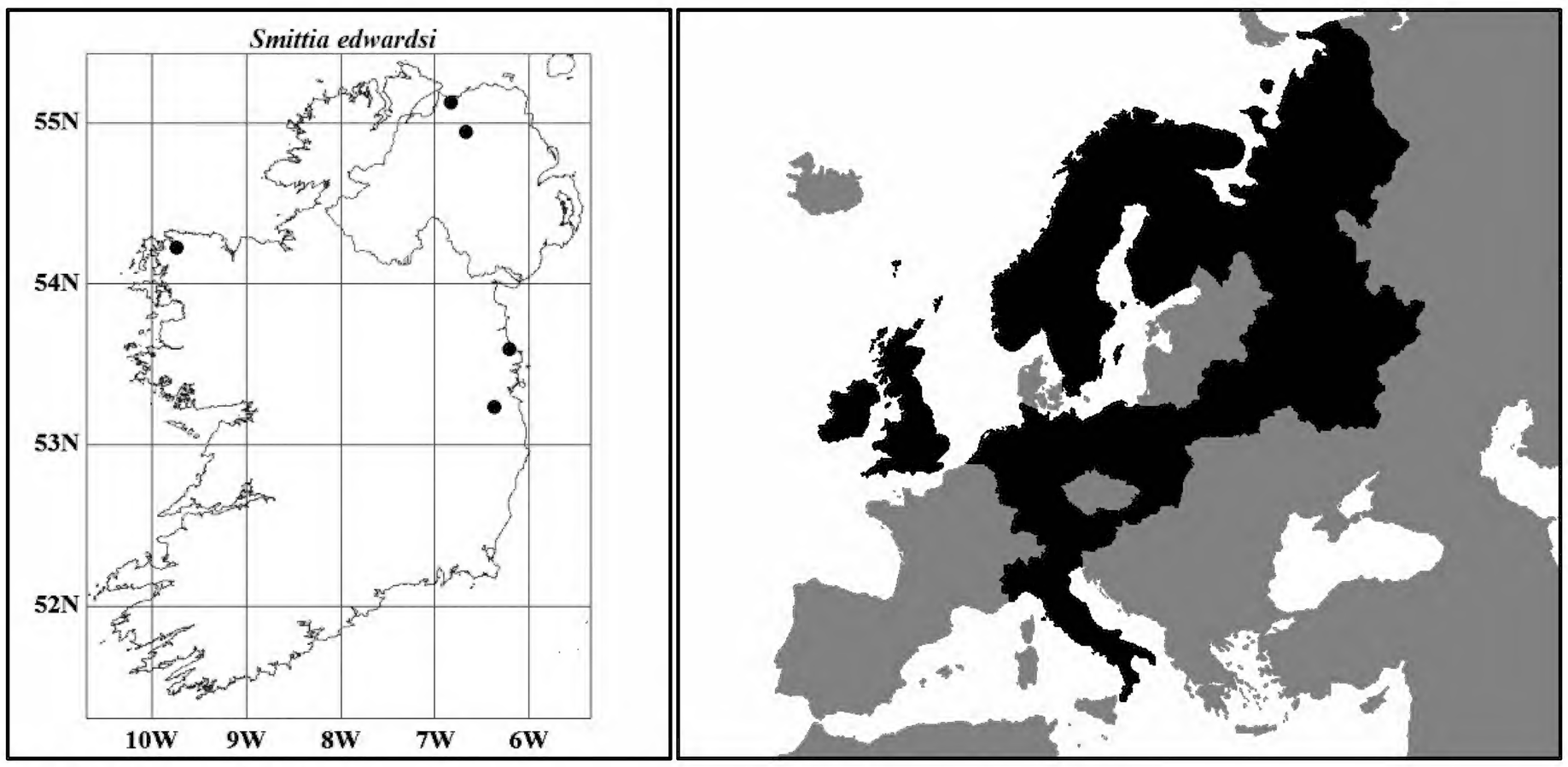
FIGURES 549-550. *Smittia amoena* Caspers, 1988.



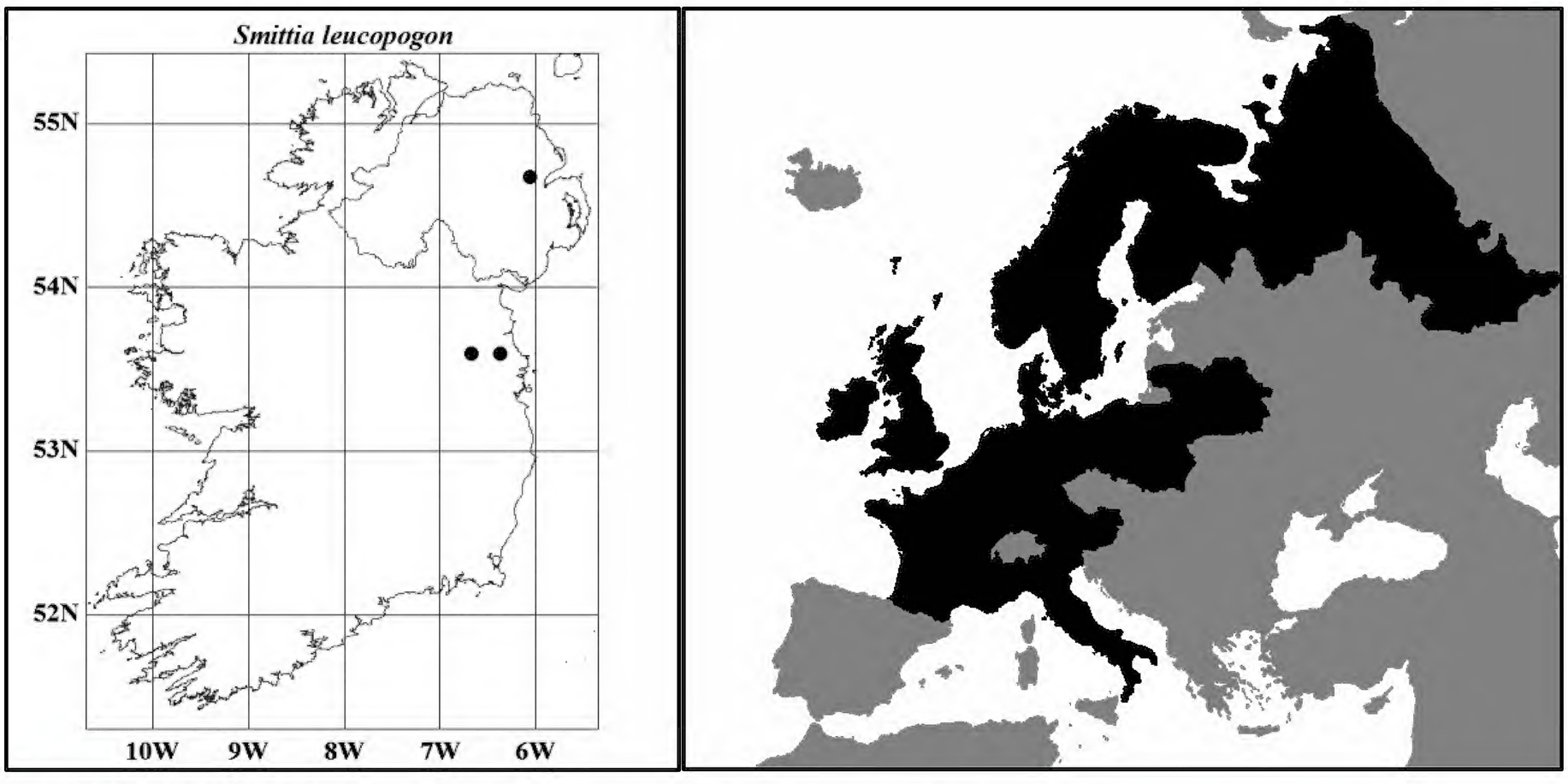
FIGURES 551-552. *Smittia aterrima* (Meigen, 1818).



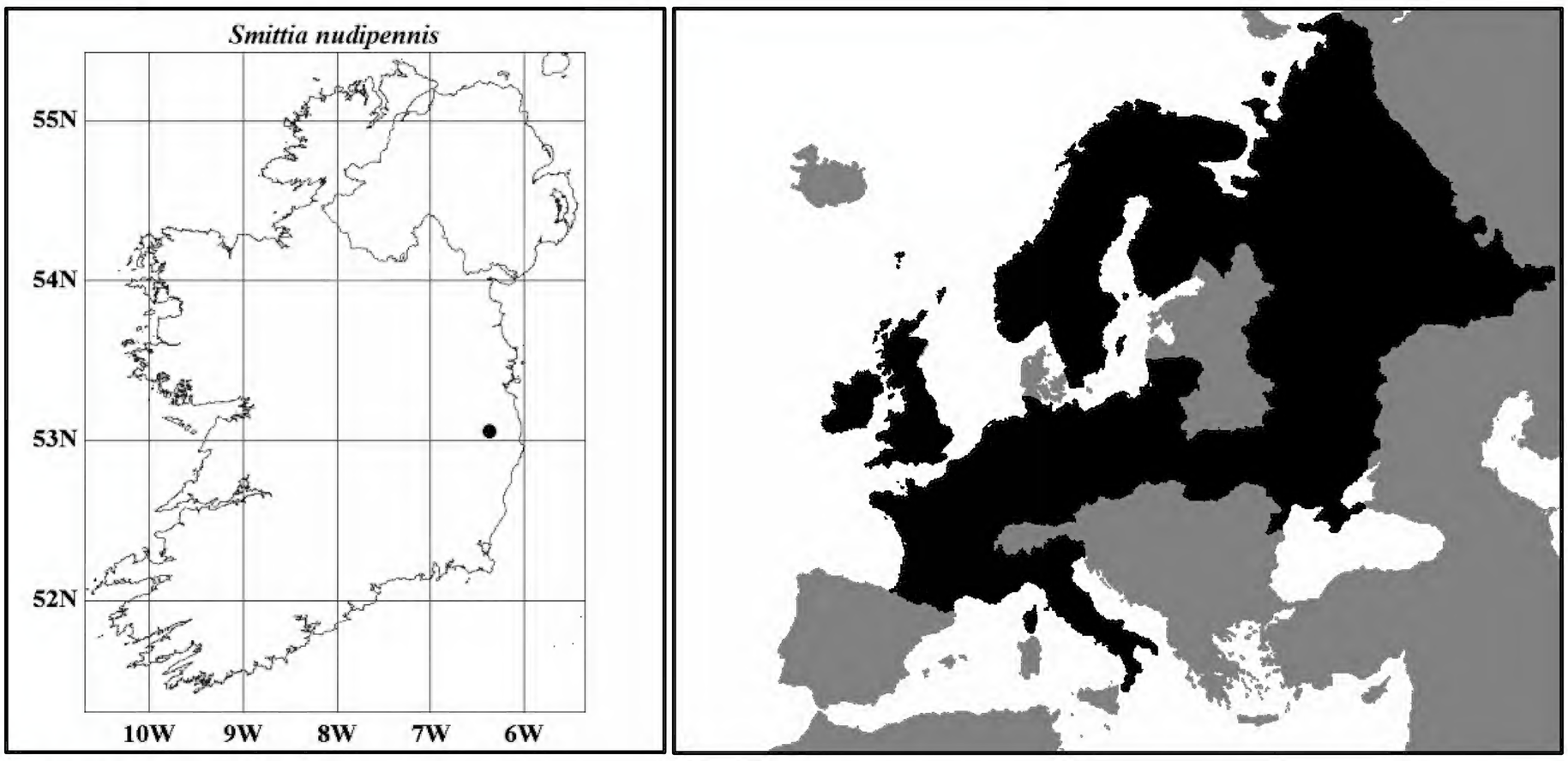
FIGURES 553-554. *Smittia contingens* (Walker, 1856).



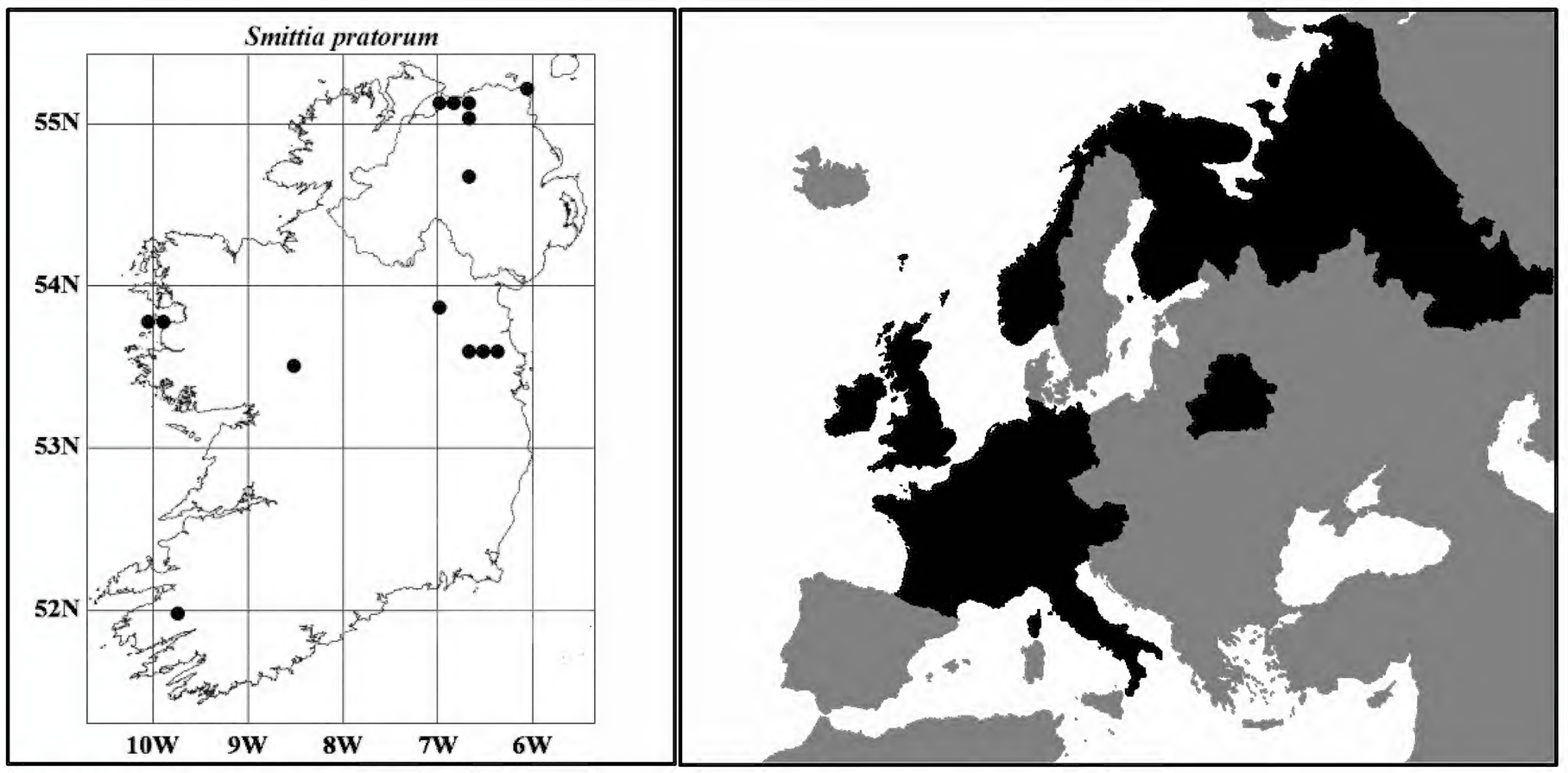
FIGURES 555-556. *Smittia edwardsi* Goetghebuer, 1932.



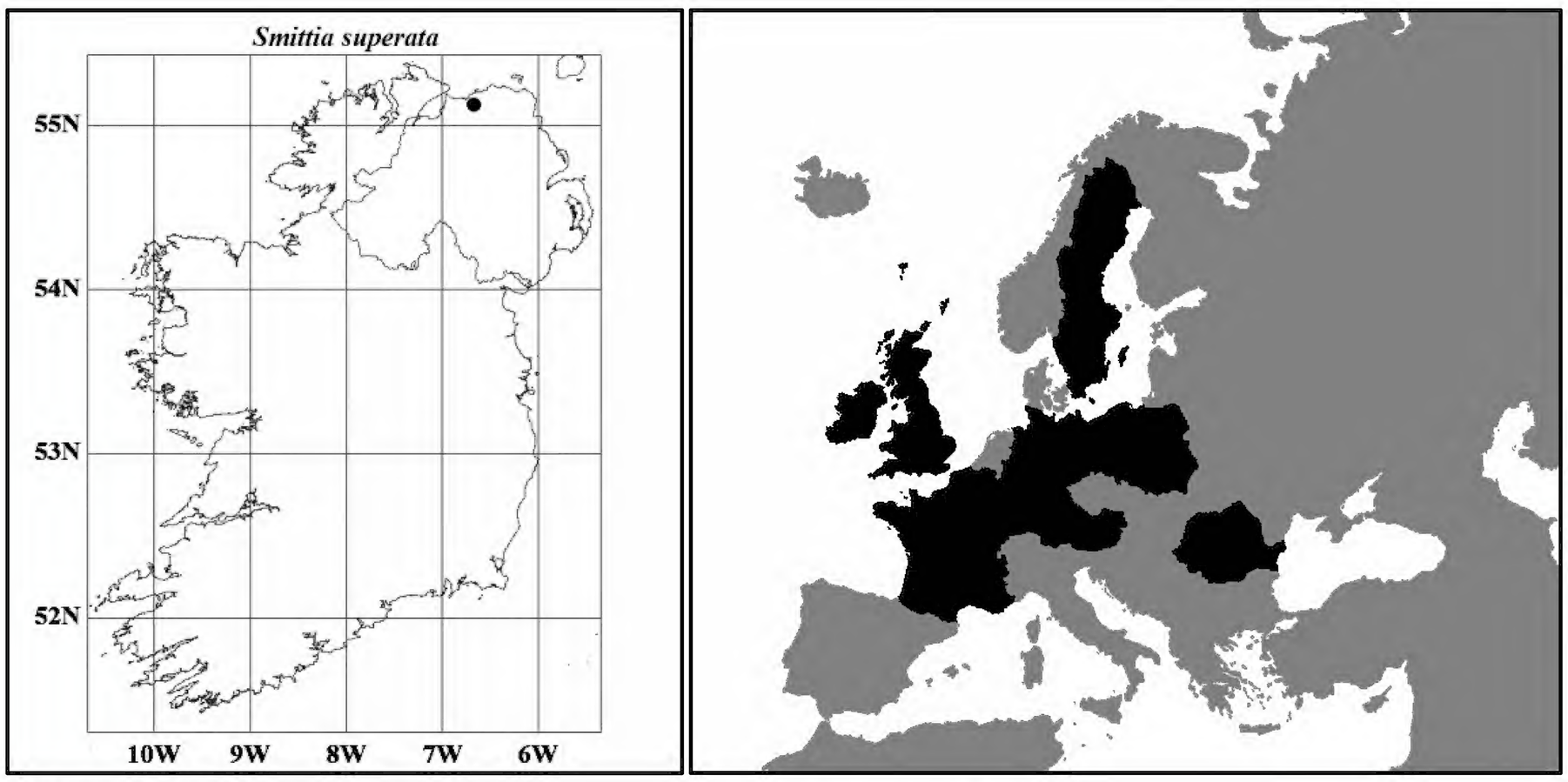
FIGURES 557-558. *Smittia leucopogon* (Meigen, 1804).



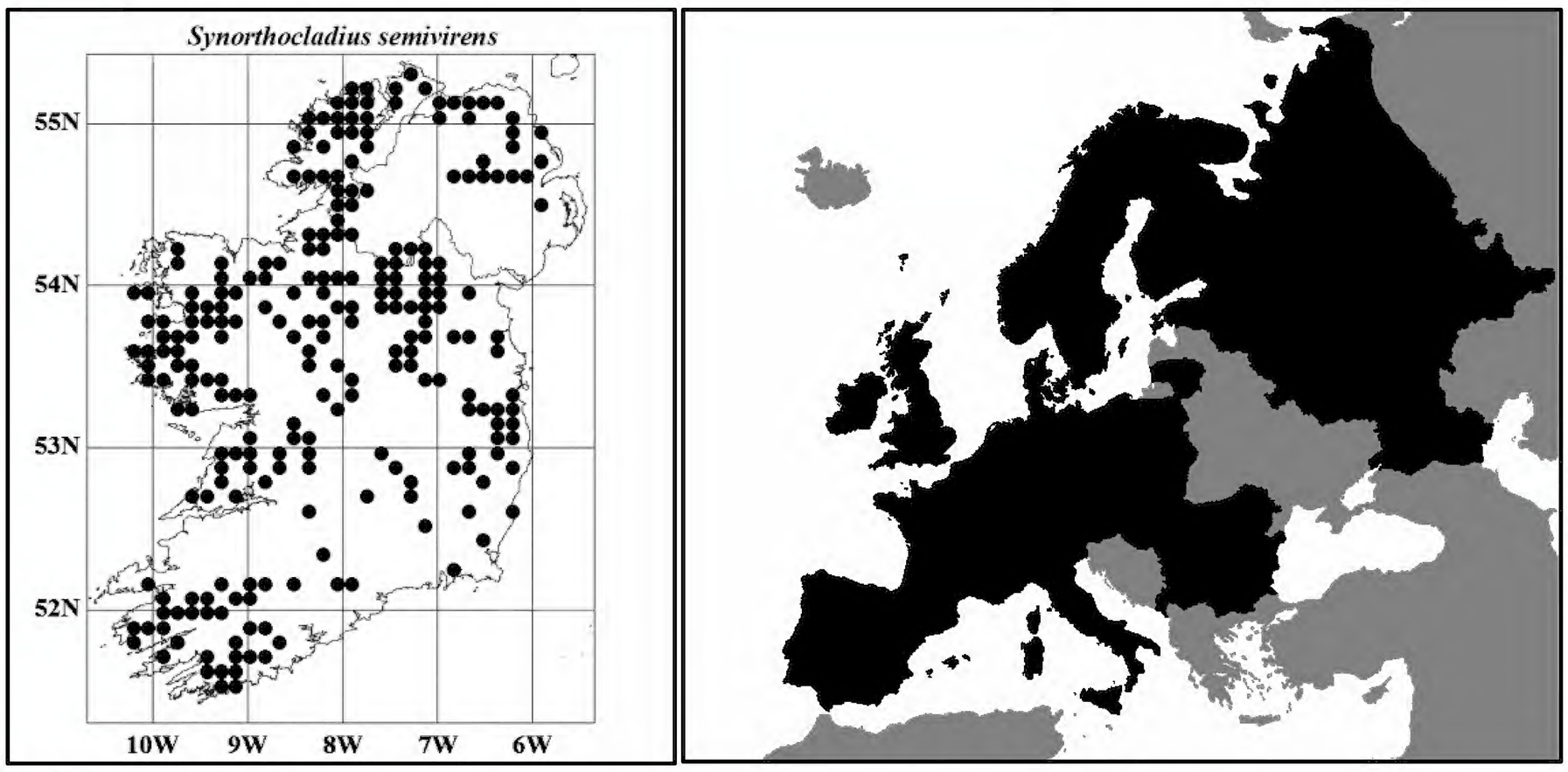
FIGURES 559-560. *Smittia nudipennis* (Goetghebuer, 1913).



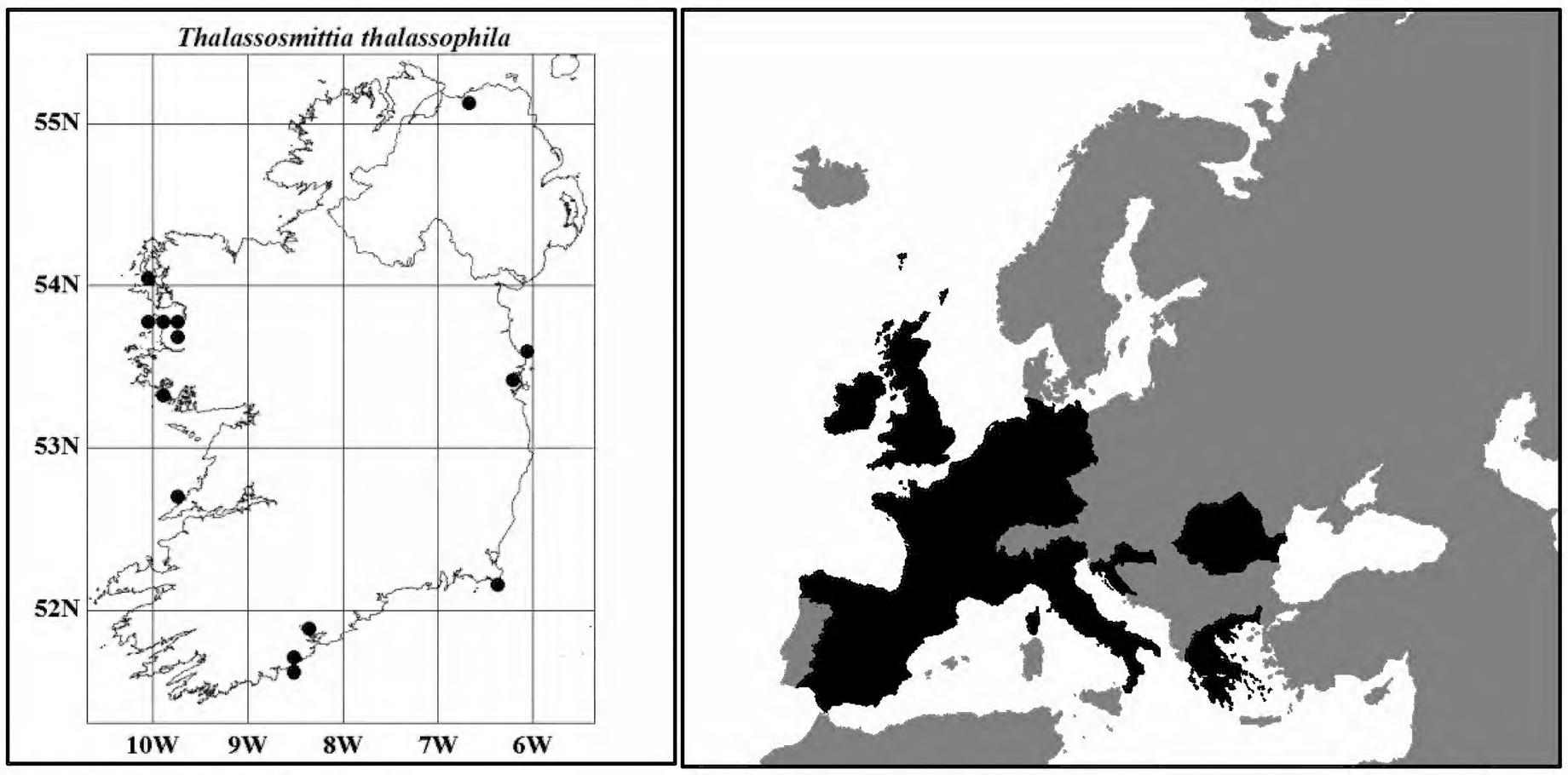
FIGURES 561-562. *Smittia pratorum* (Goetghebuer, 1927).



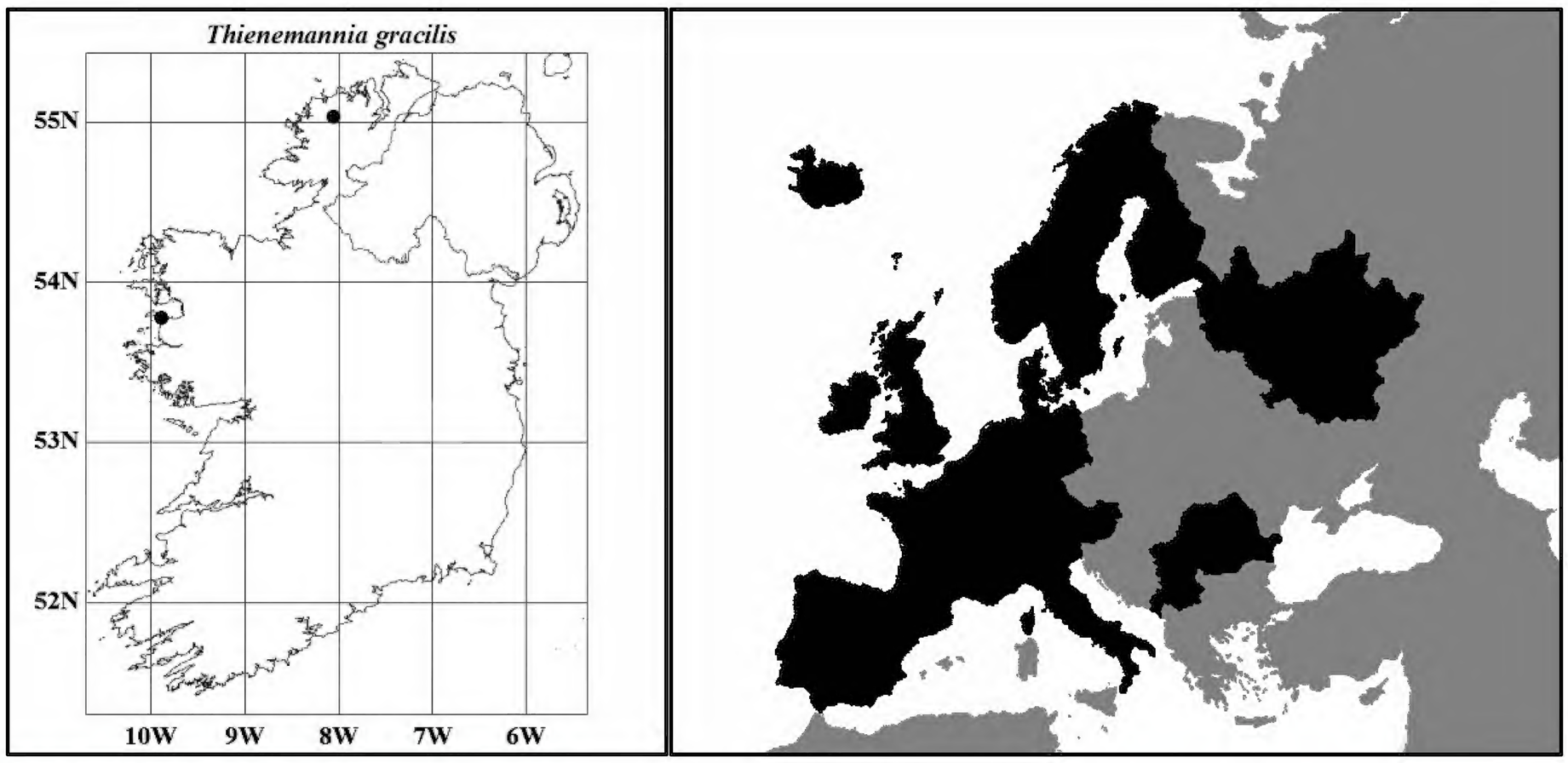
FIGURES 563-564. *Smittia superata* Goetghebuer, 1939.



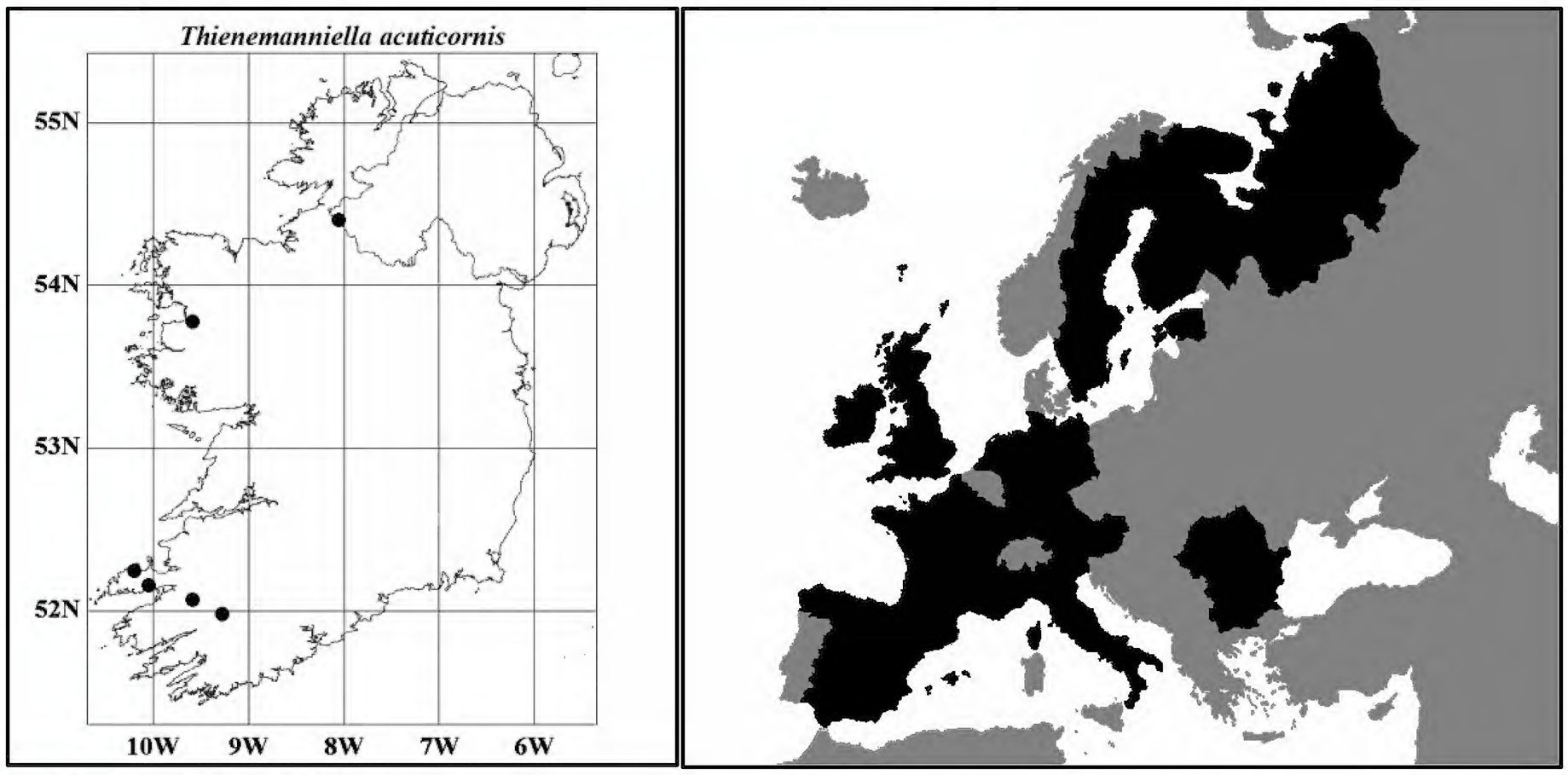
FIGURES 565-566. *Synorthocladius semivirens* (Kieffer, 1909).



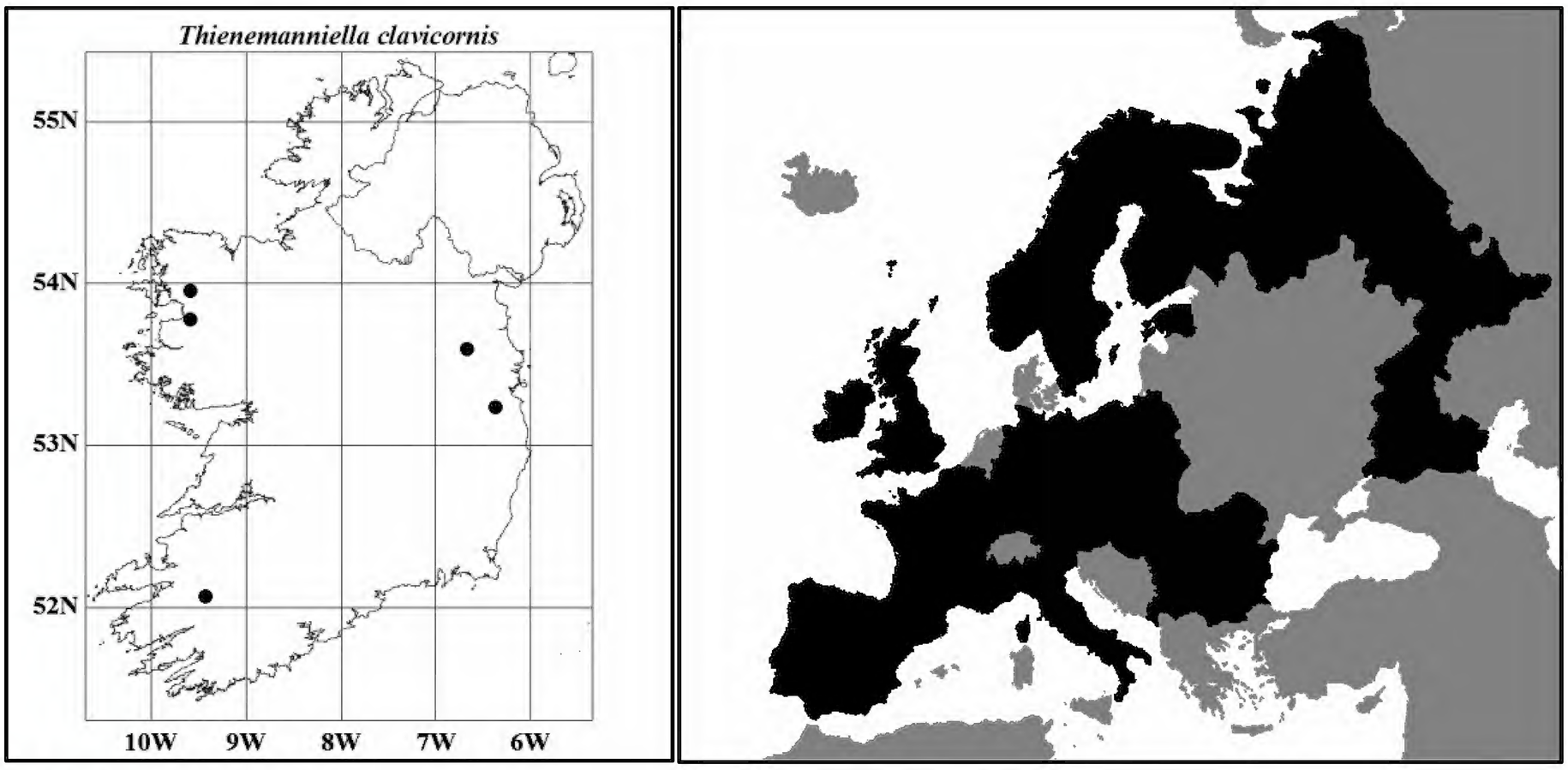
FIGURES 567-568. *Thalassosmittia thalassophila* (Bequaert & Goetghebuer, 1914).



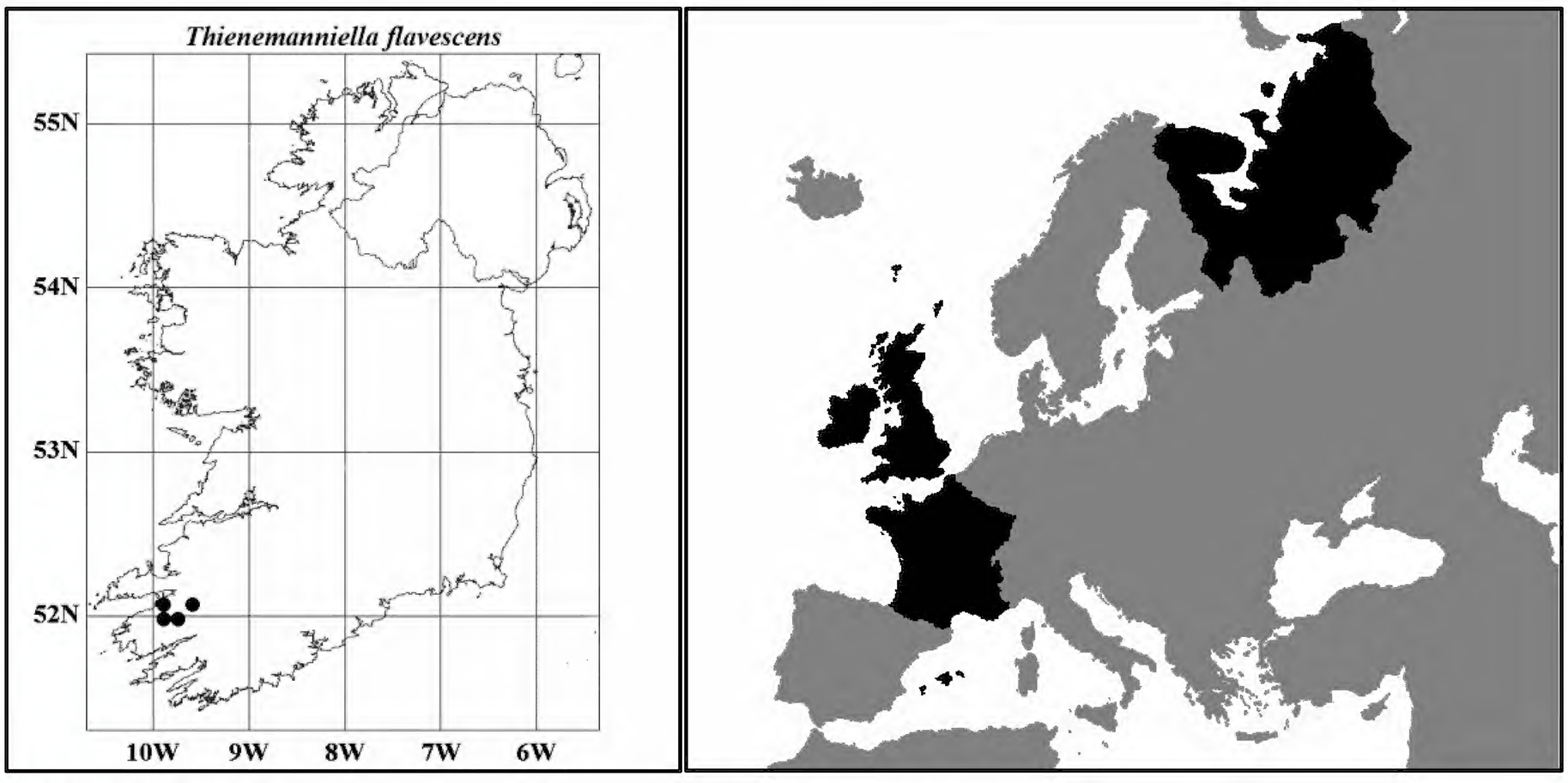
FIGURES 569-570. *Thienemannia gracilis* Kieffer, 1909.



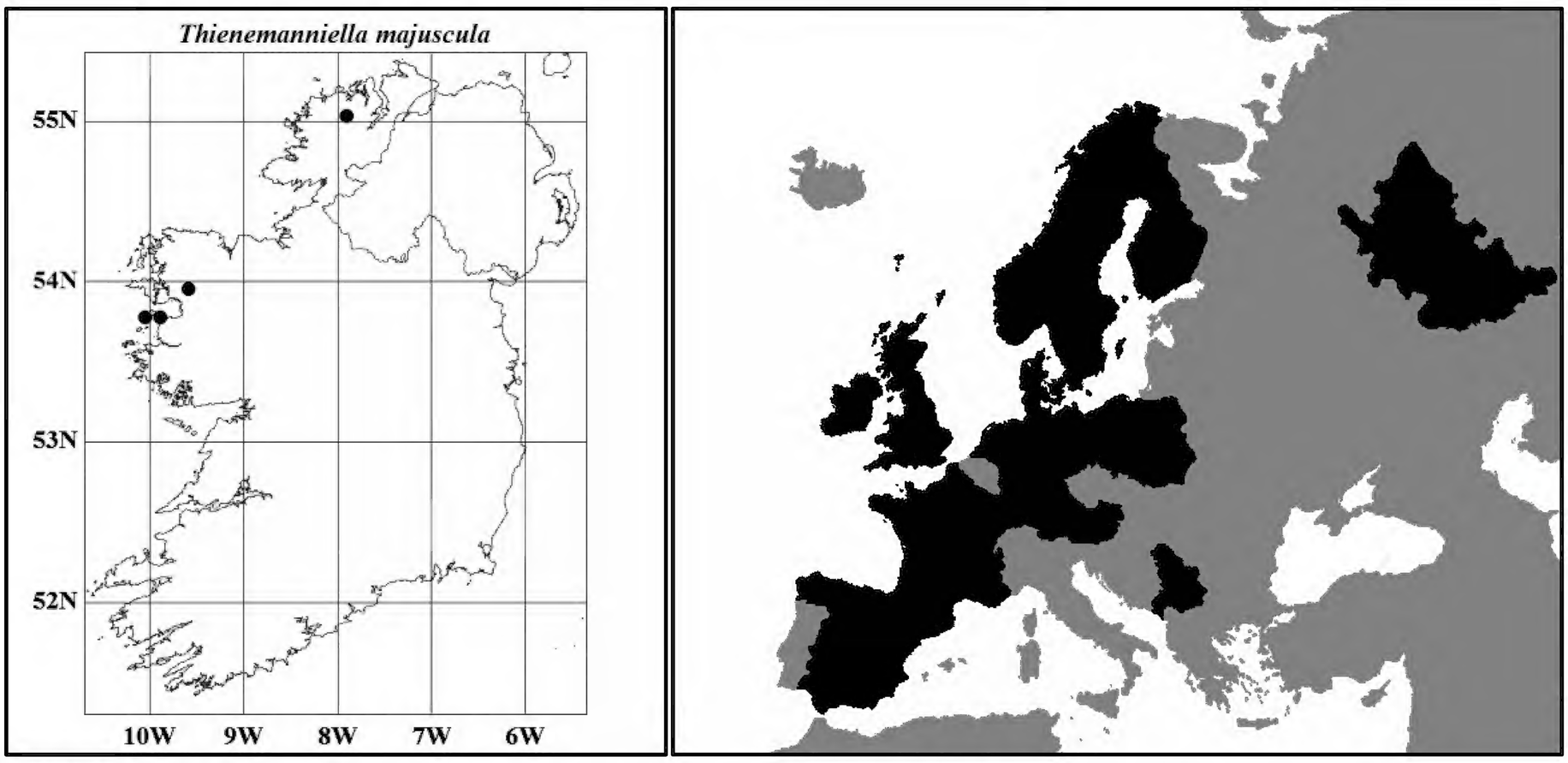
FIGURES 571-572. *Thienemanniellia acuticornis* (Kieffer, 1912).



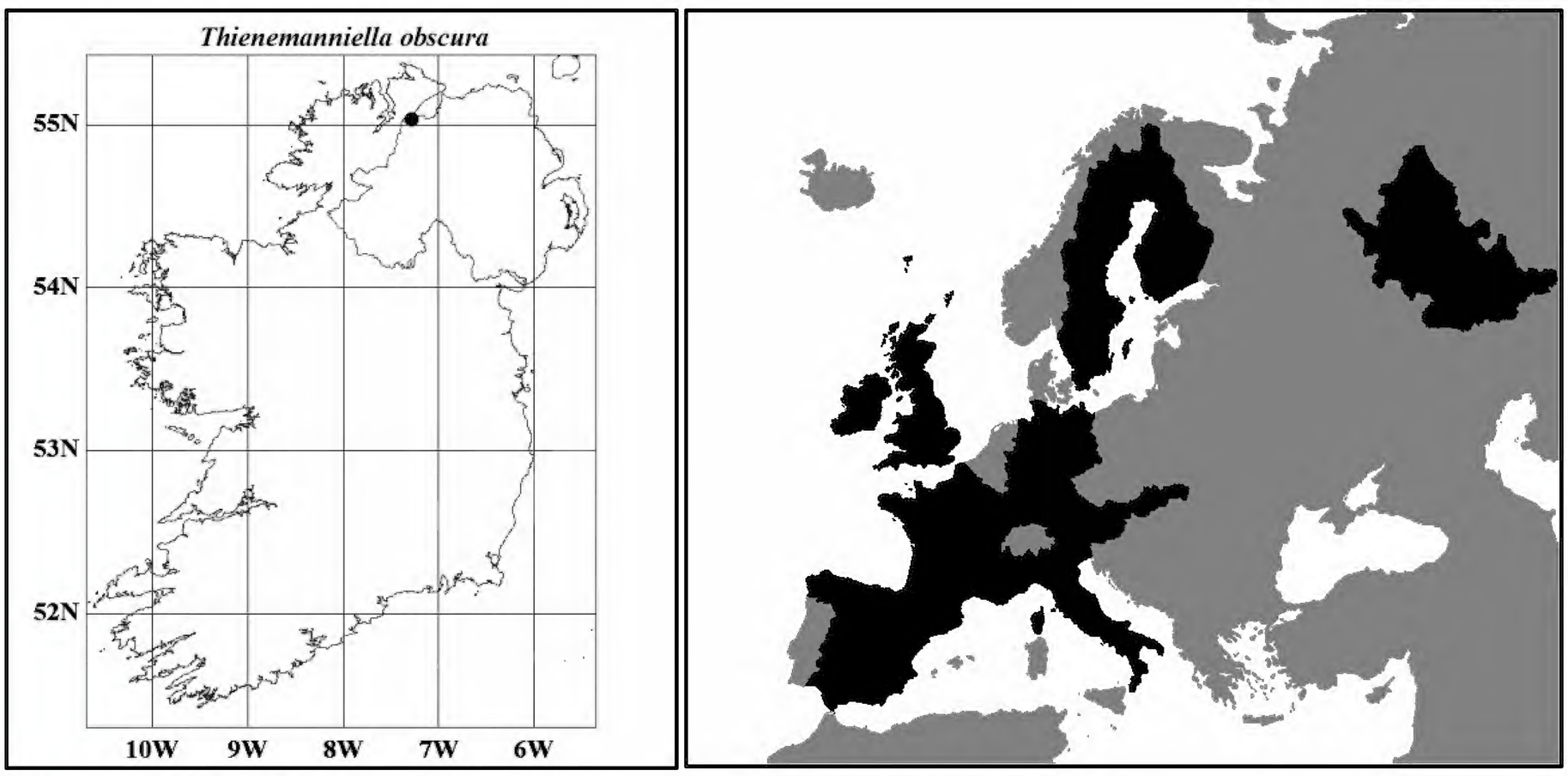
FIGURES 573-574. *Thienemanniellia clavicornis* (Kieffer, 1911).



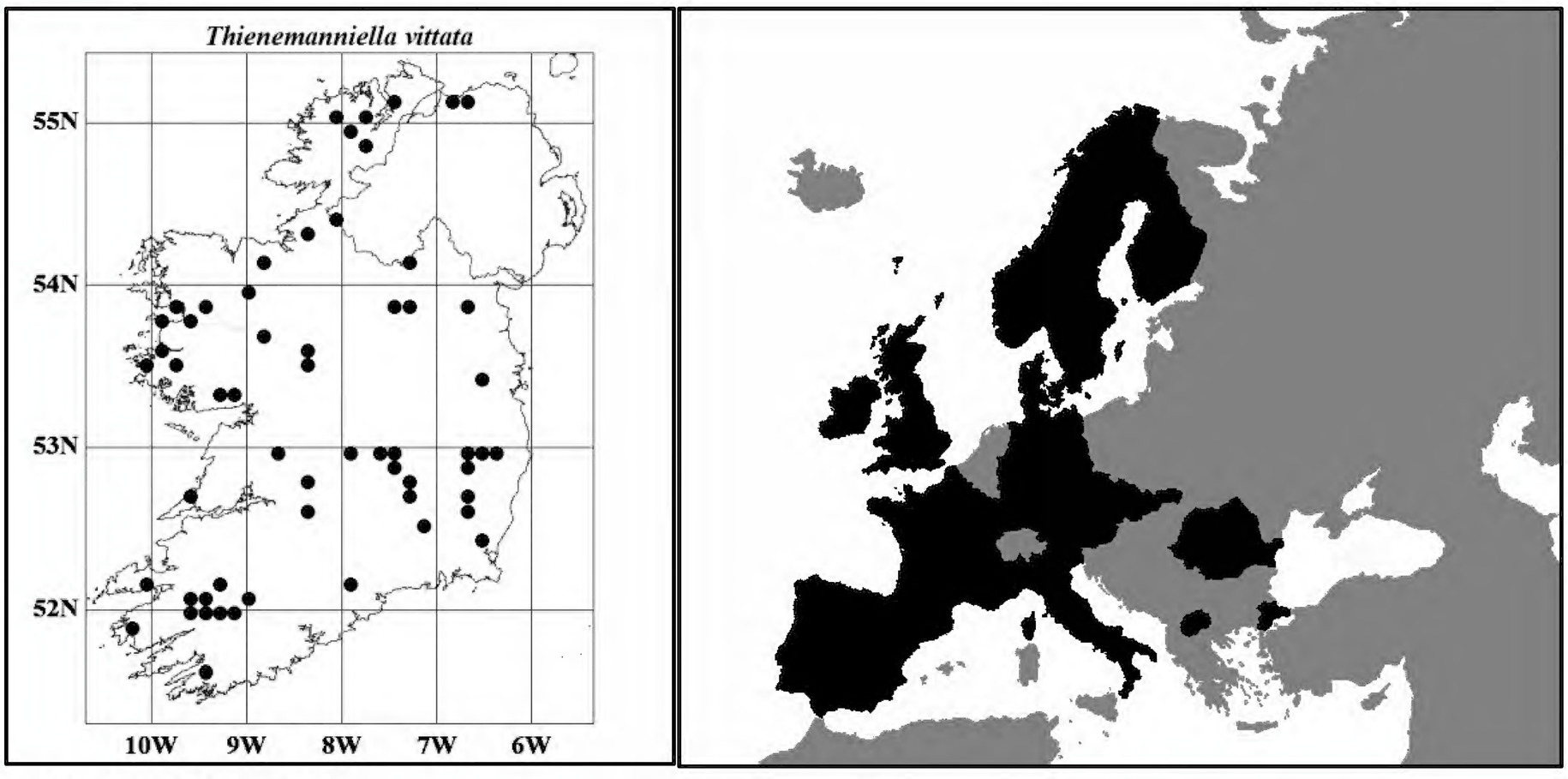
FIGURES 575-576. *Thienemanniellia flavescens* (Edwards, 1929).



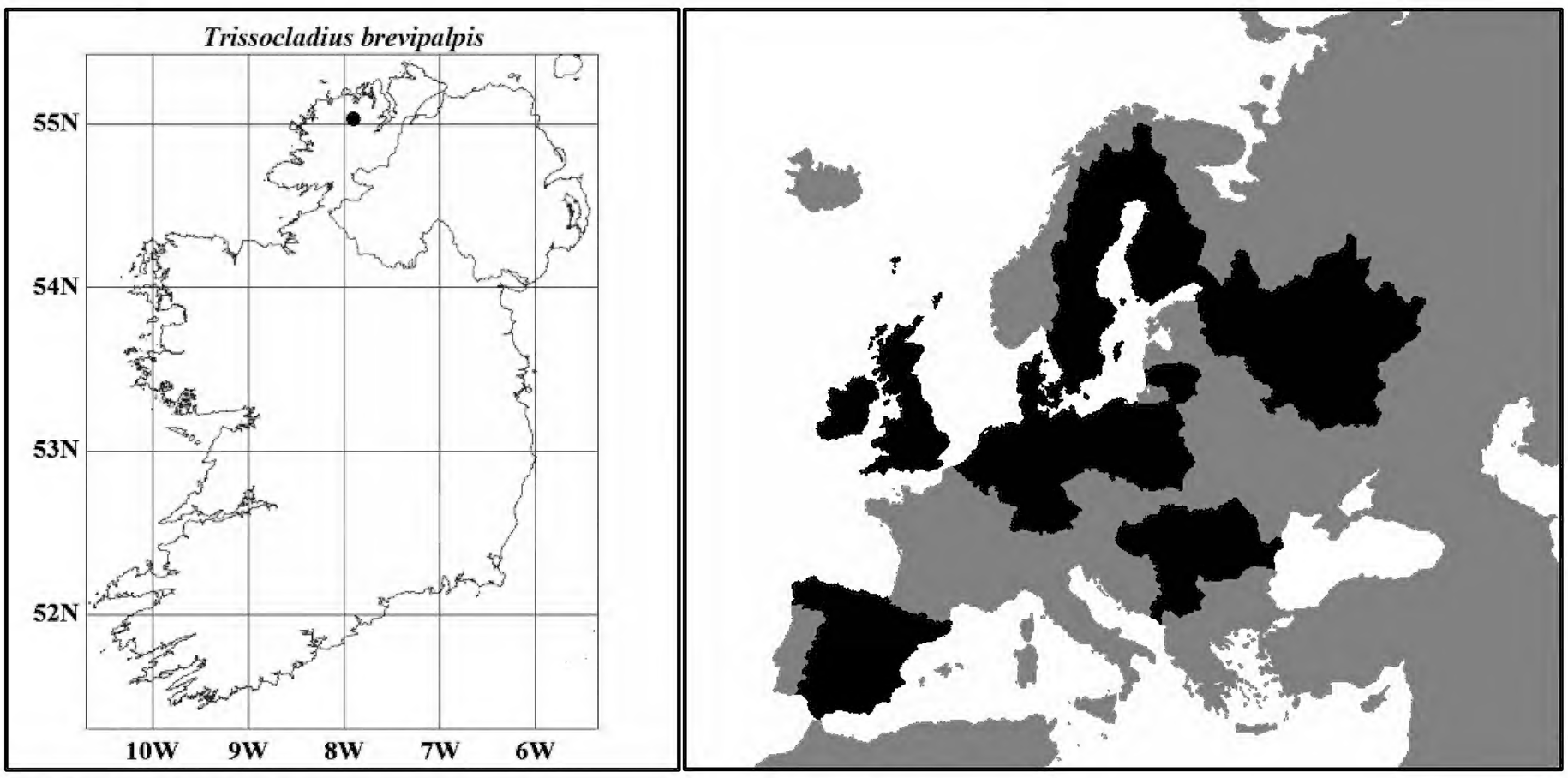
FIGURES 577-578. *Thienemanniellia majuscula* (Edwards, 1924).



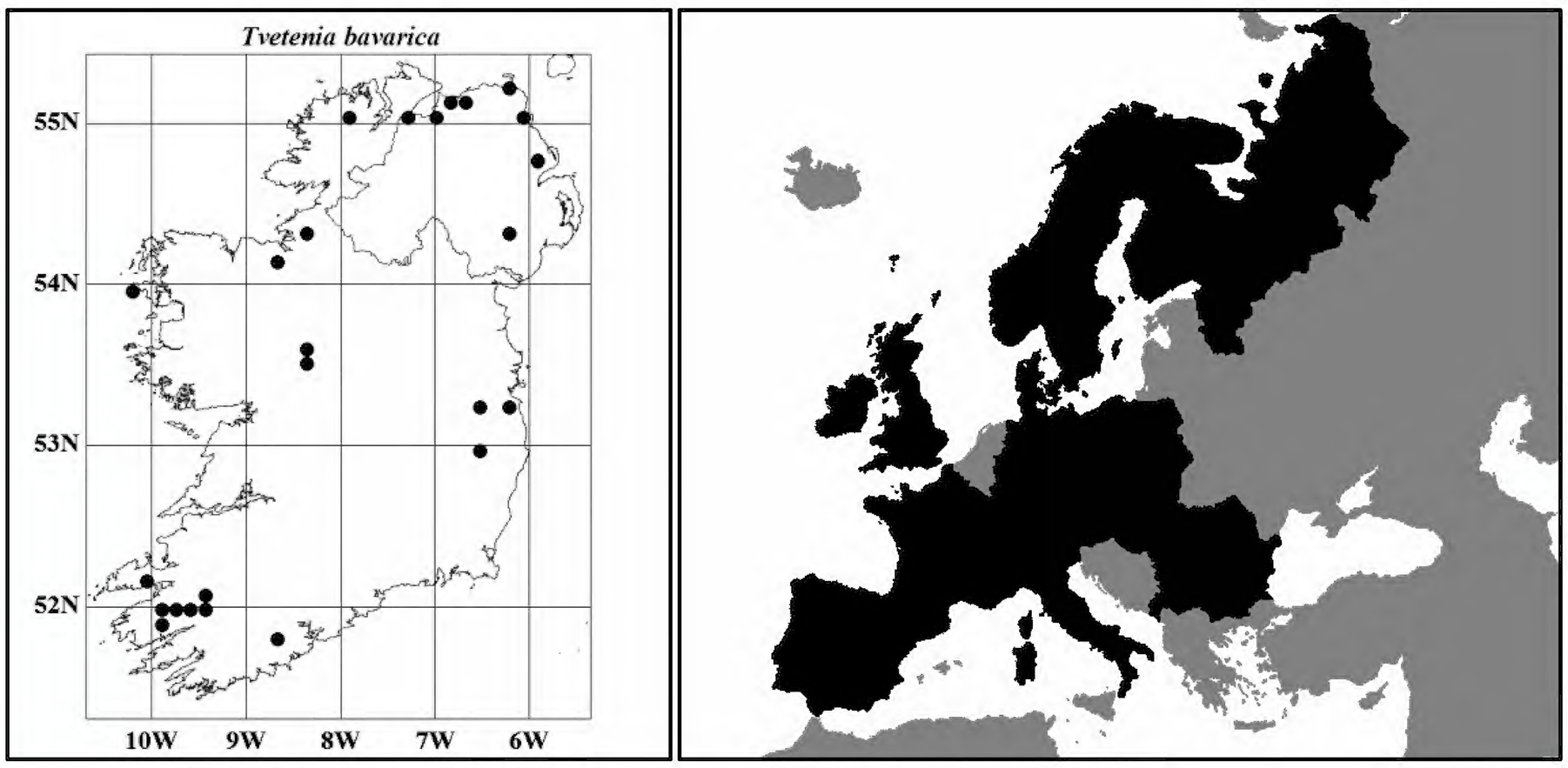
FIGURES 579-580. *Thienemanniellia obscura* Brundin, 1947.



FIGURES 581-582. *Thienemanniellia vittata* (Edwards, 1924).

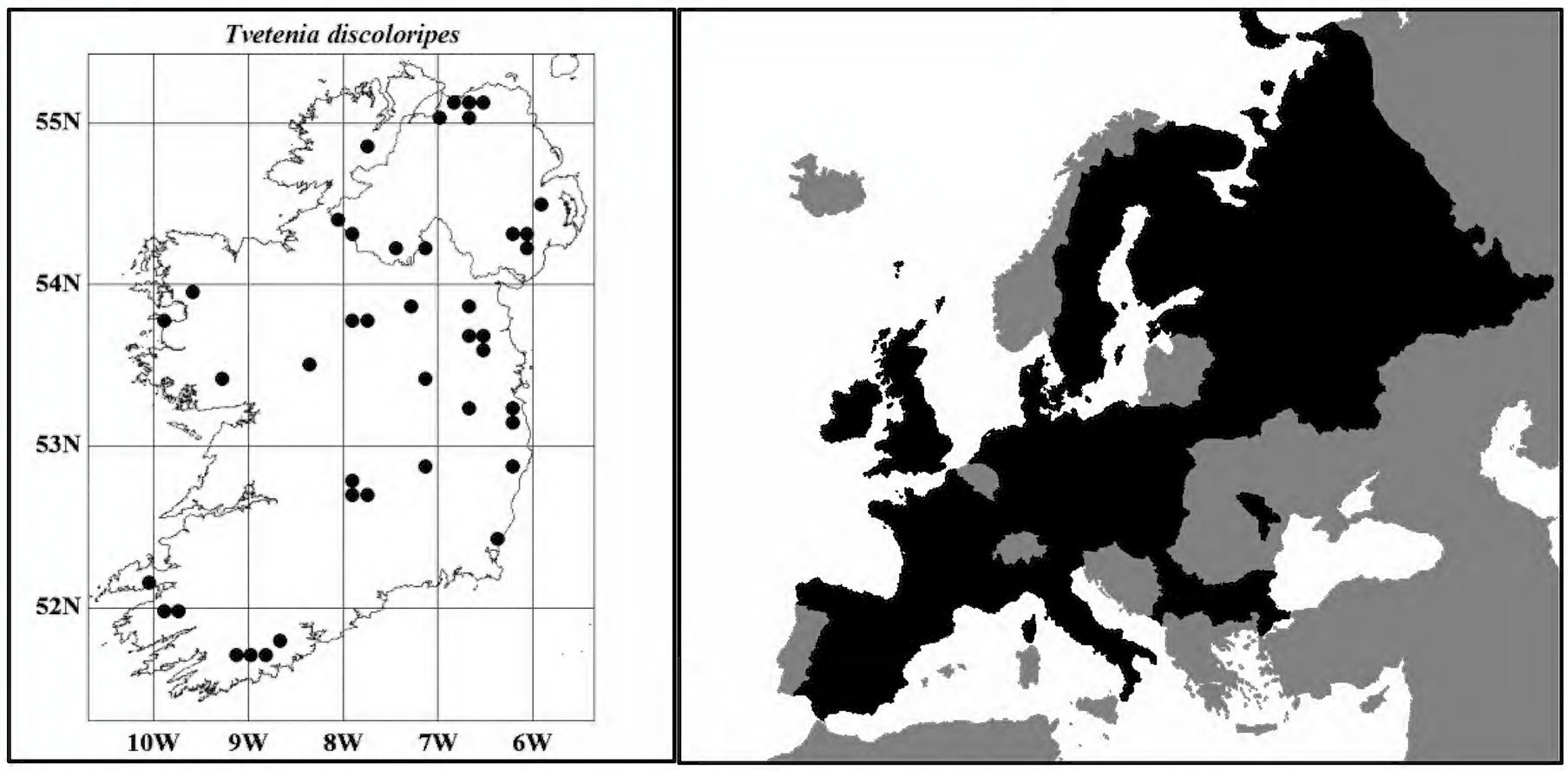


FIGURES 583-584. *Trissocladius brevipalpis* Kieffer, 1908.

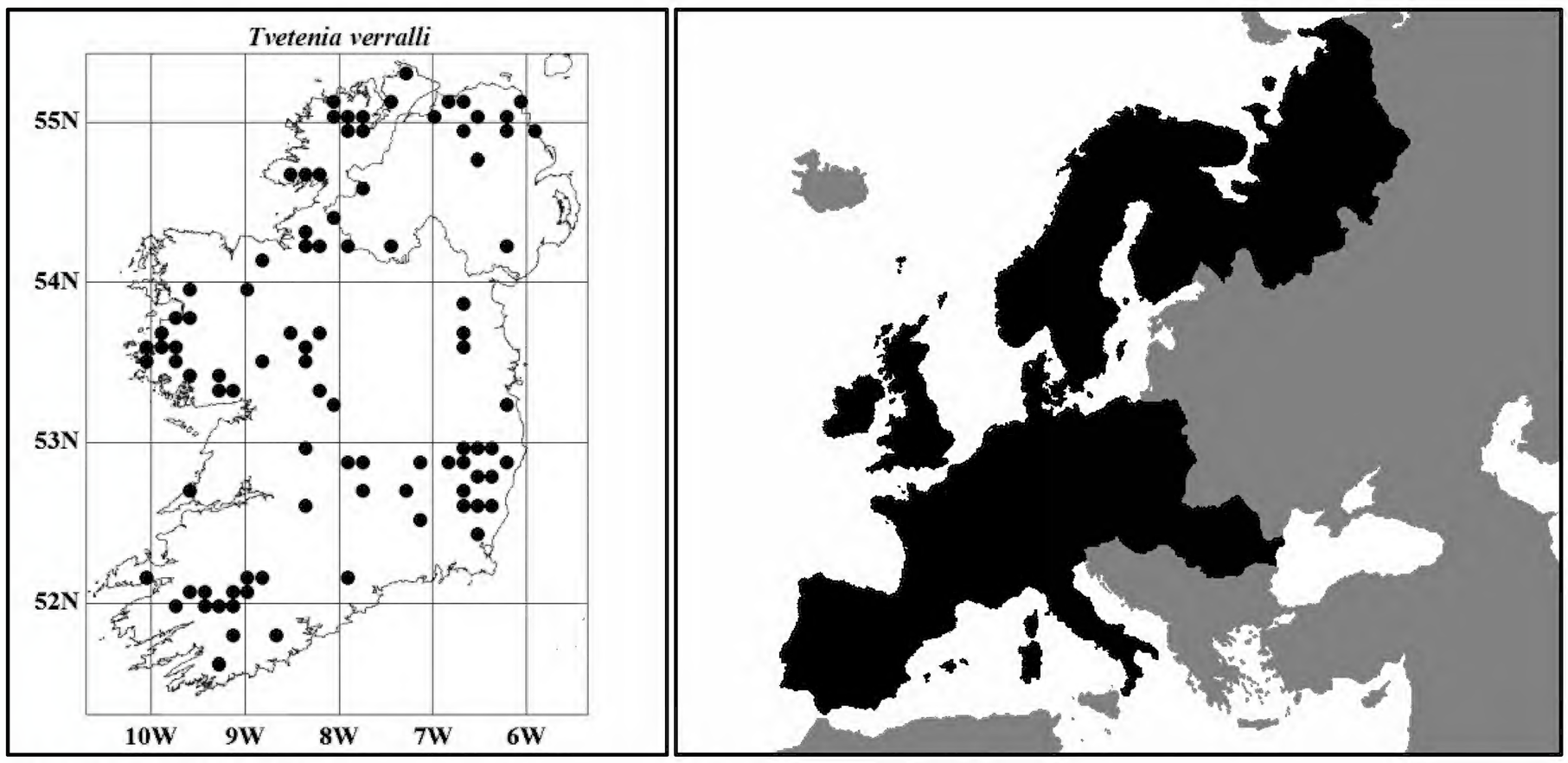


FIGURES 585-586. *Tvetenia bavarica* (Goetghebuer, 1934).

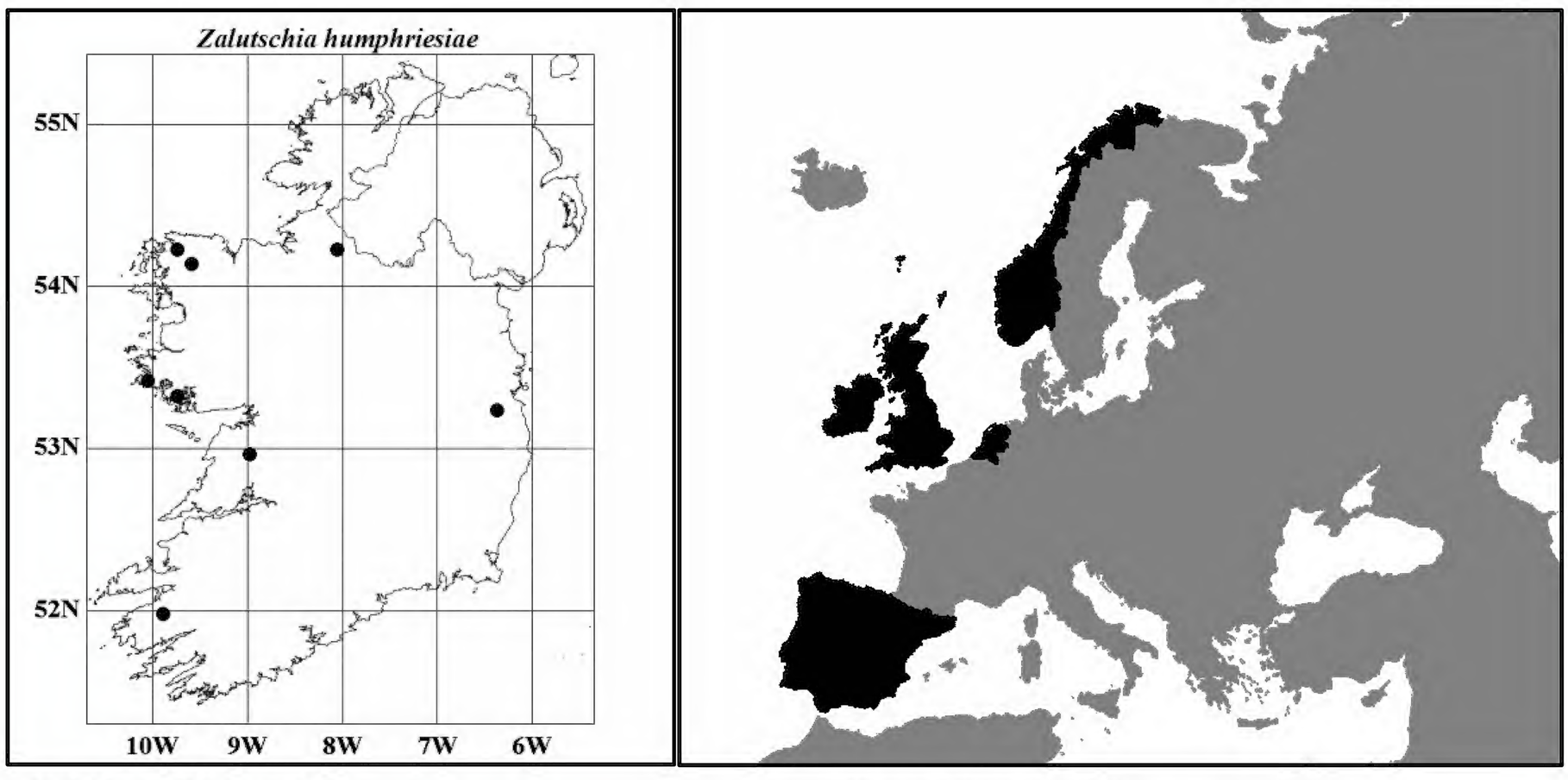
FIGURES 587-588. *Tvetenia calvescens* (Edwards, 1929).



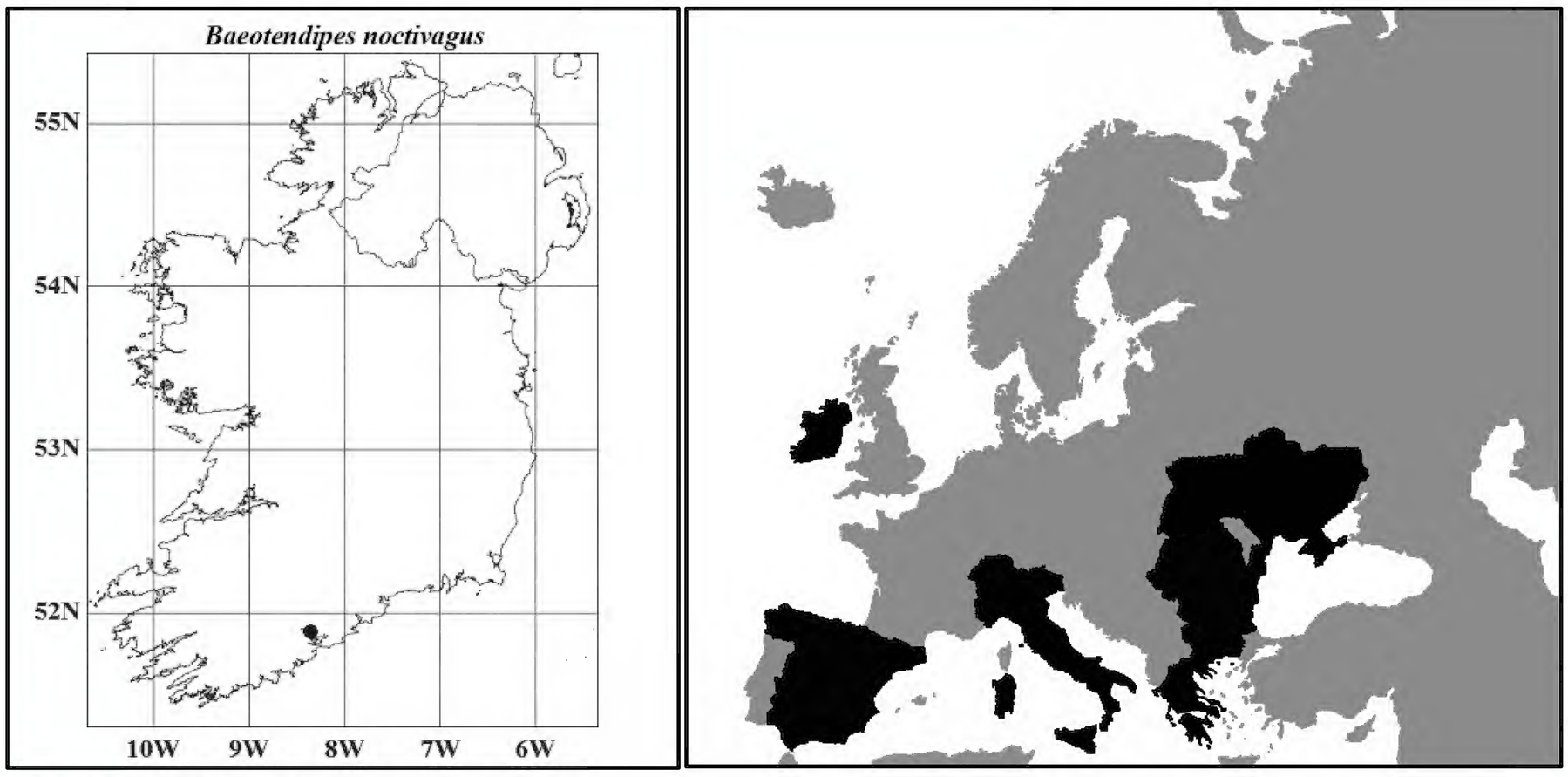
FIGURES 589-590. *Tvetenia discoloripes* (Goetghebuer & Thienemann, 1936).



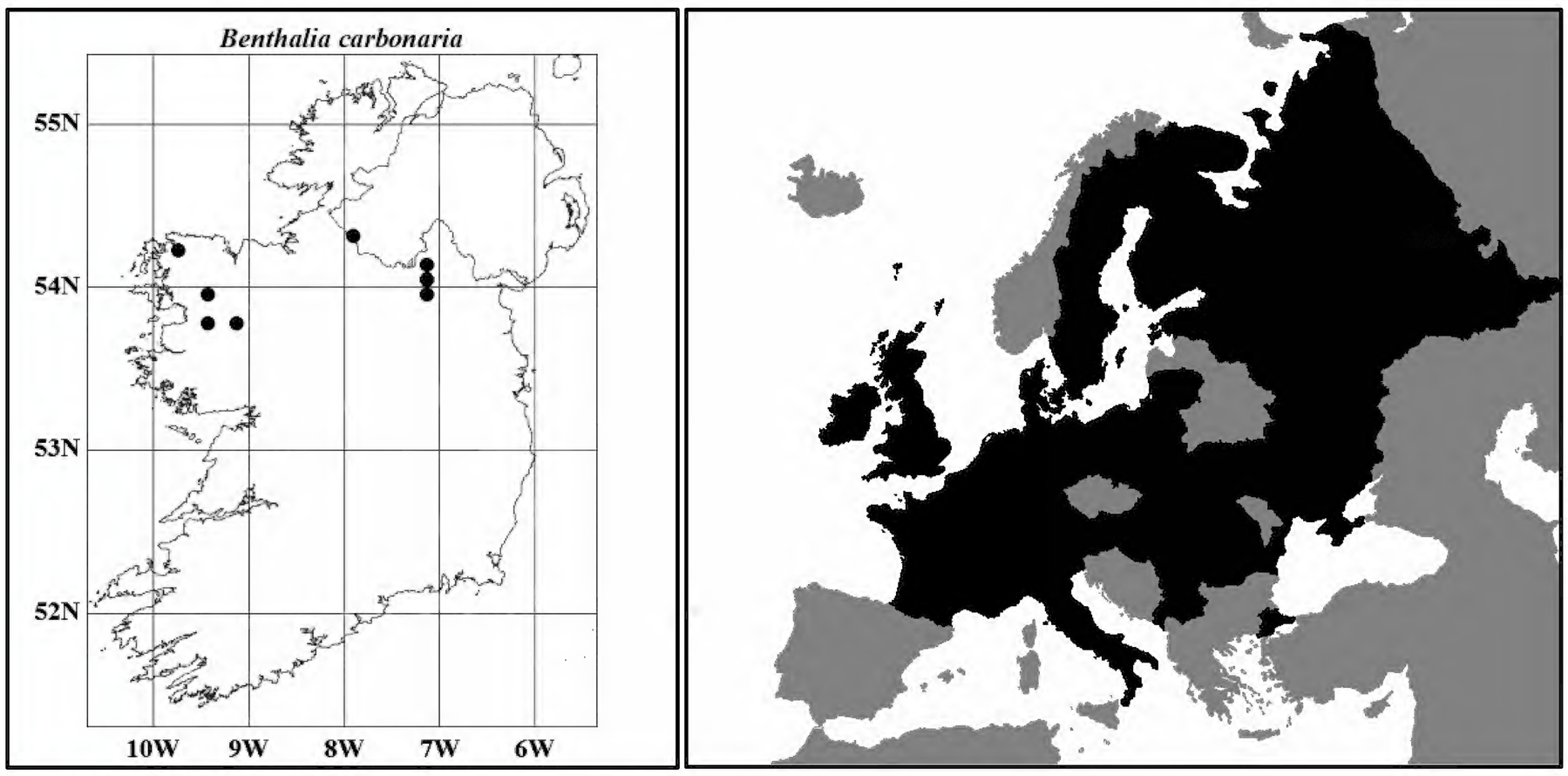
FIGURES 591-592. *Tvetenia verralli* (Edwards, 1929).



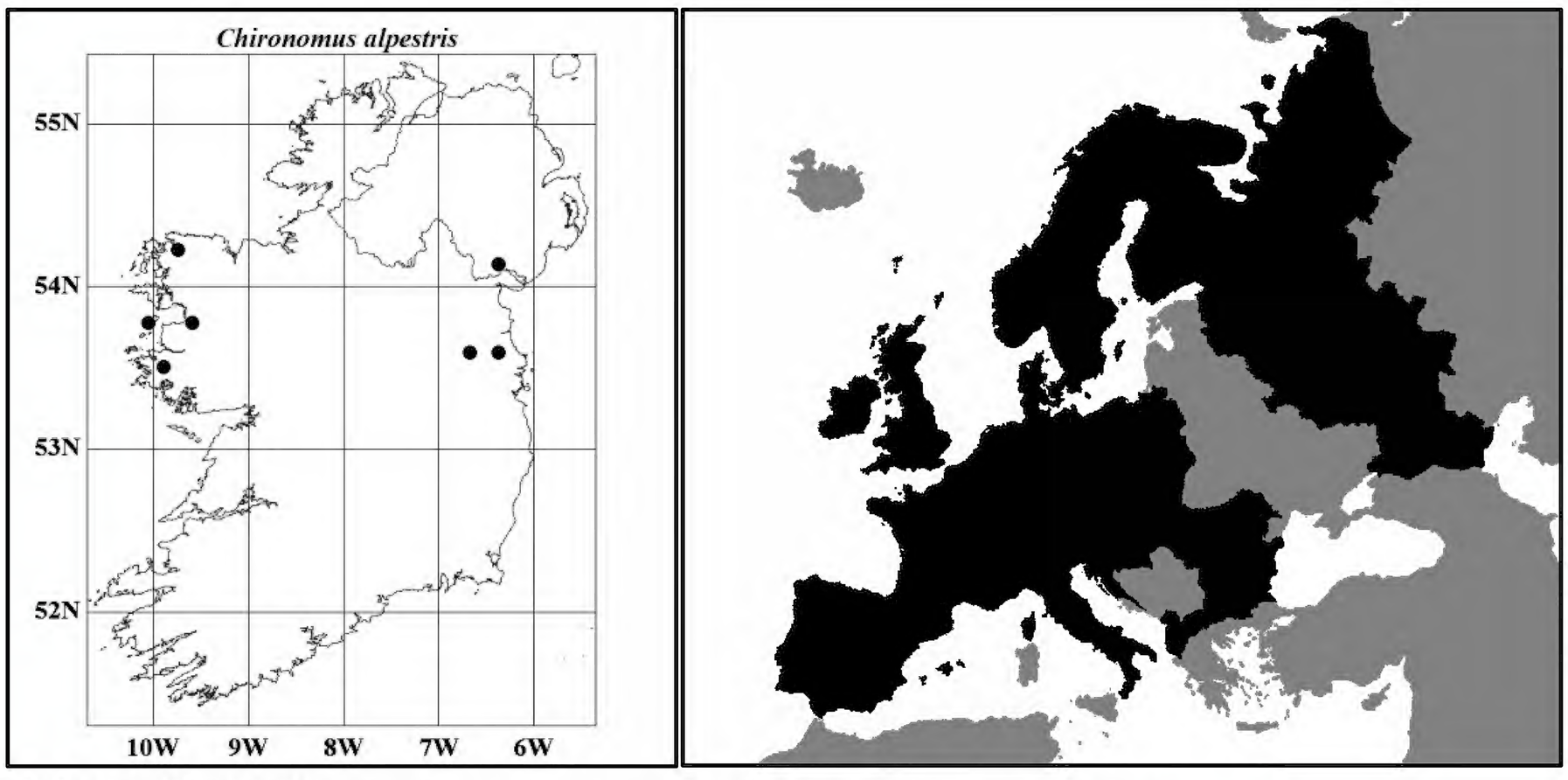
FIGURES 593-594. *Zalutschia humphriesiae* Dowling & Murray, 1980.



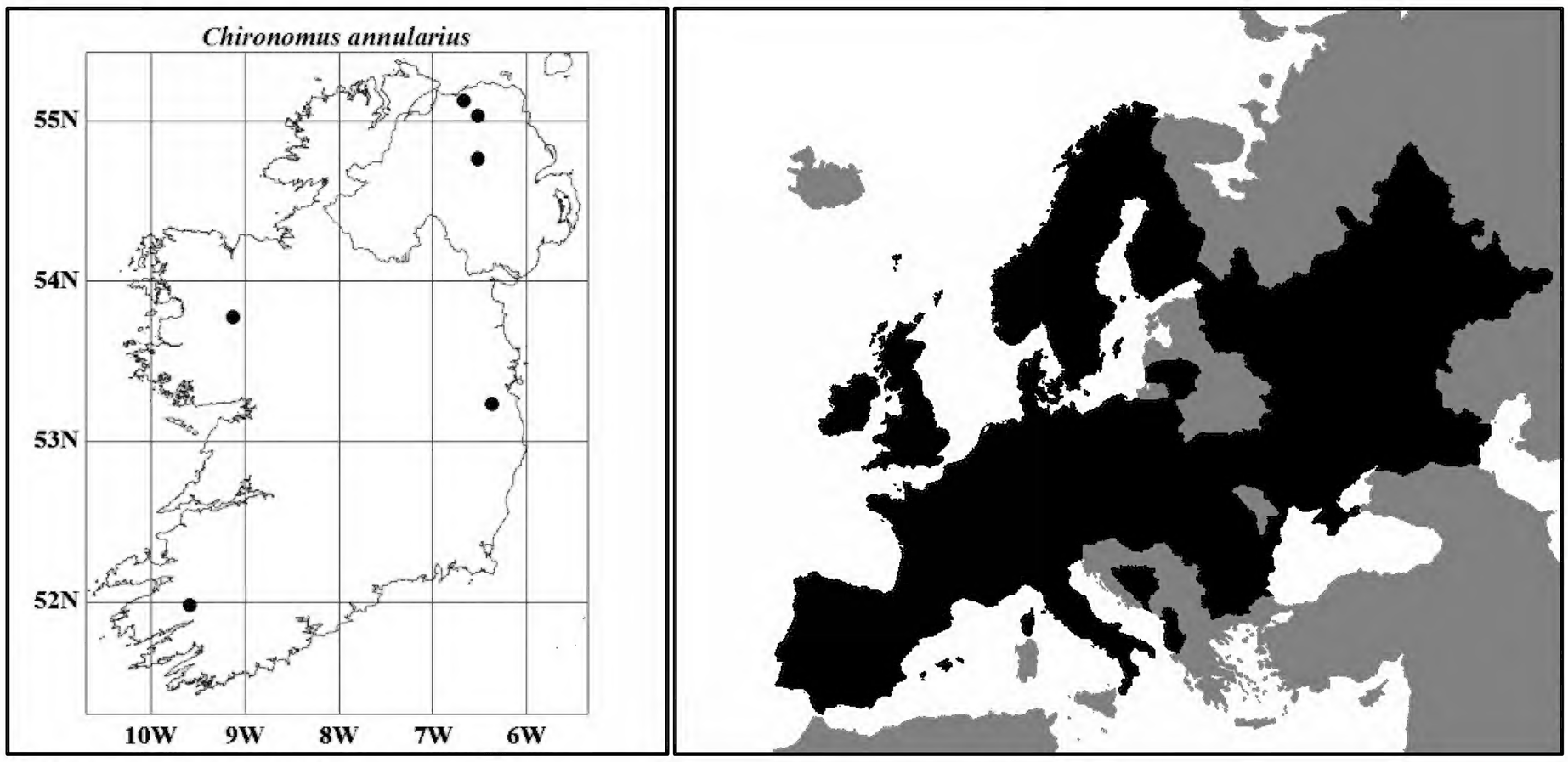
FIGURES 595-596. *Baeotendipes noctivagus* (Kieffer, 1911).



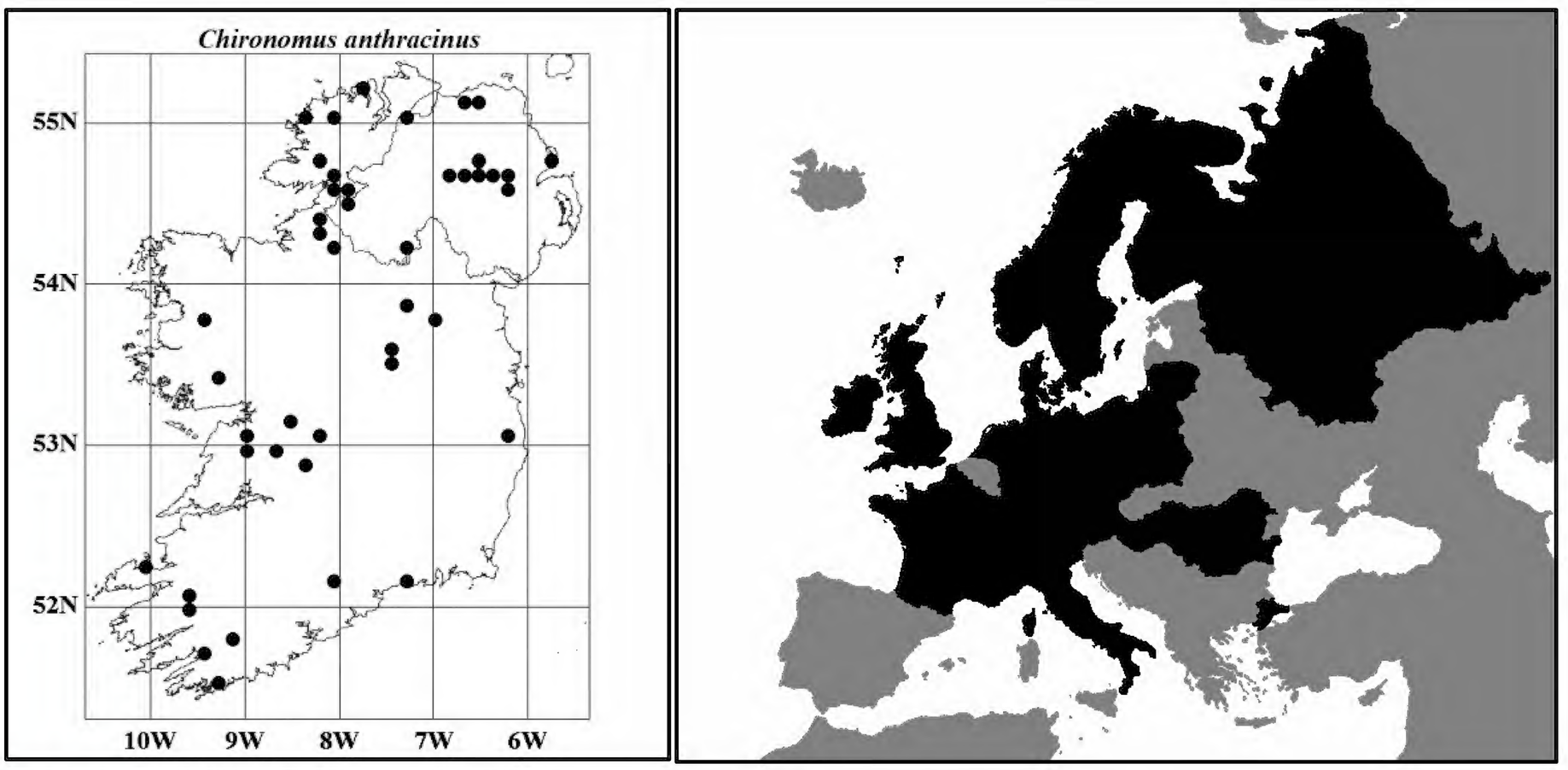
FIGURES 597-598. *Benthalia carbonaria* (Meigen, 1804).



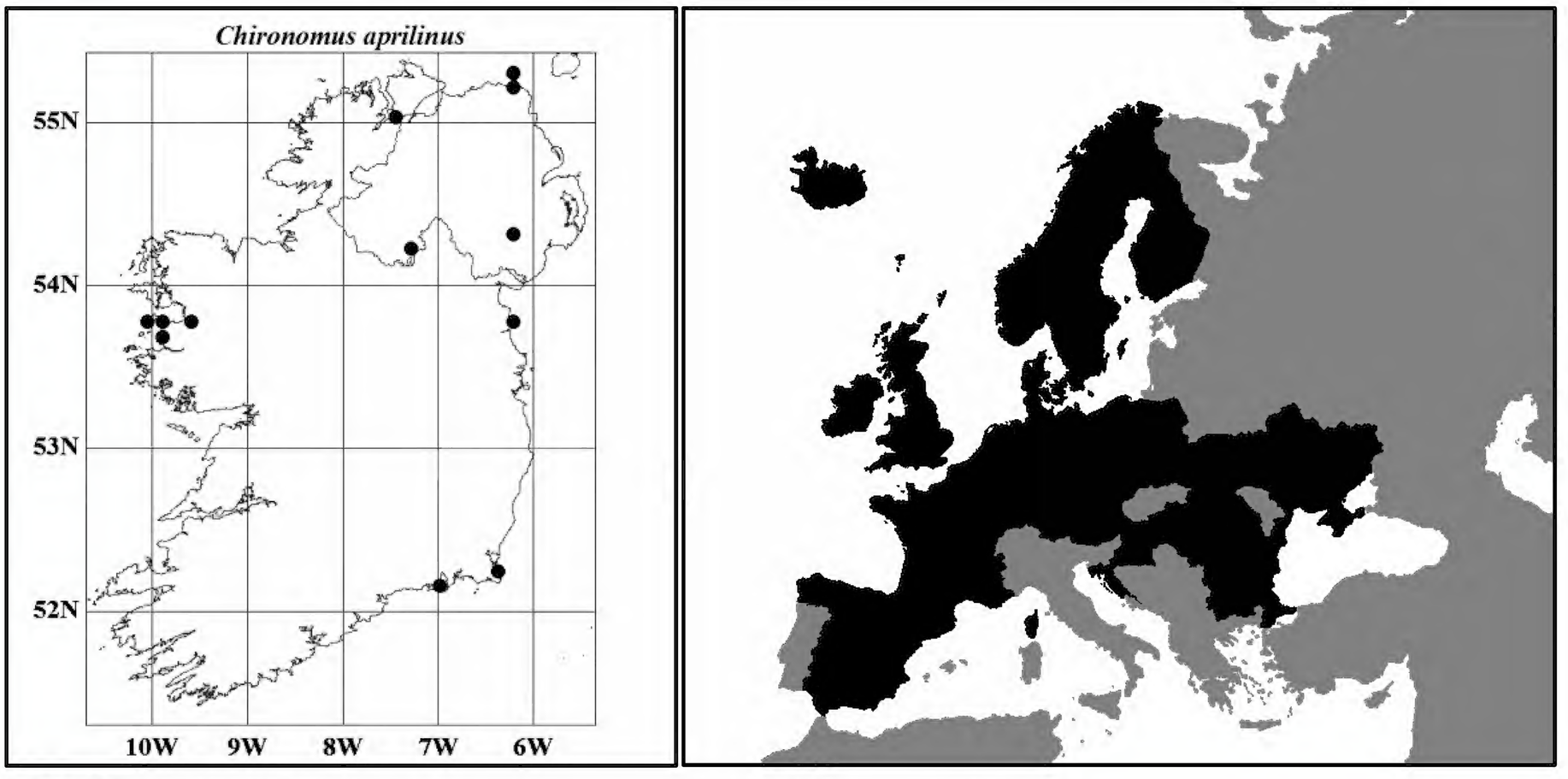
FIGURES 599-600. *Chironomus alpestris* Goetghebuer, 1934.



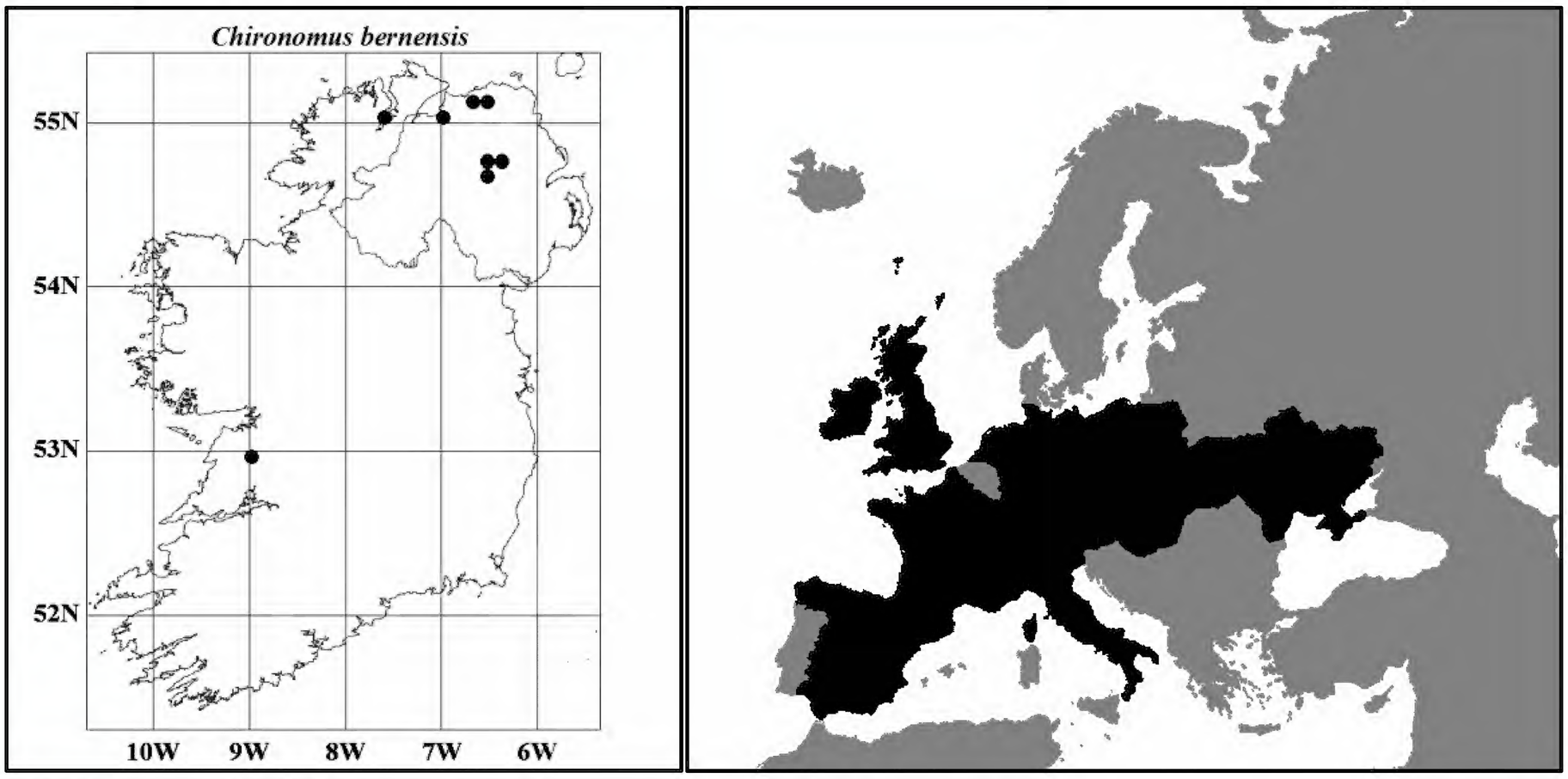
FIGURES 601-602. *Chironomus annularius* Auctt. (Meigen, 1818).



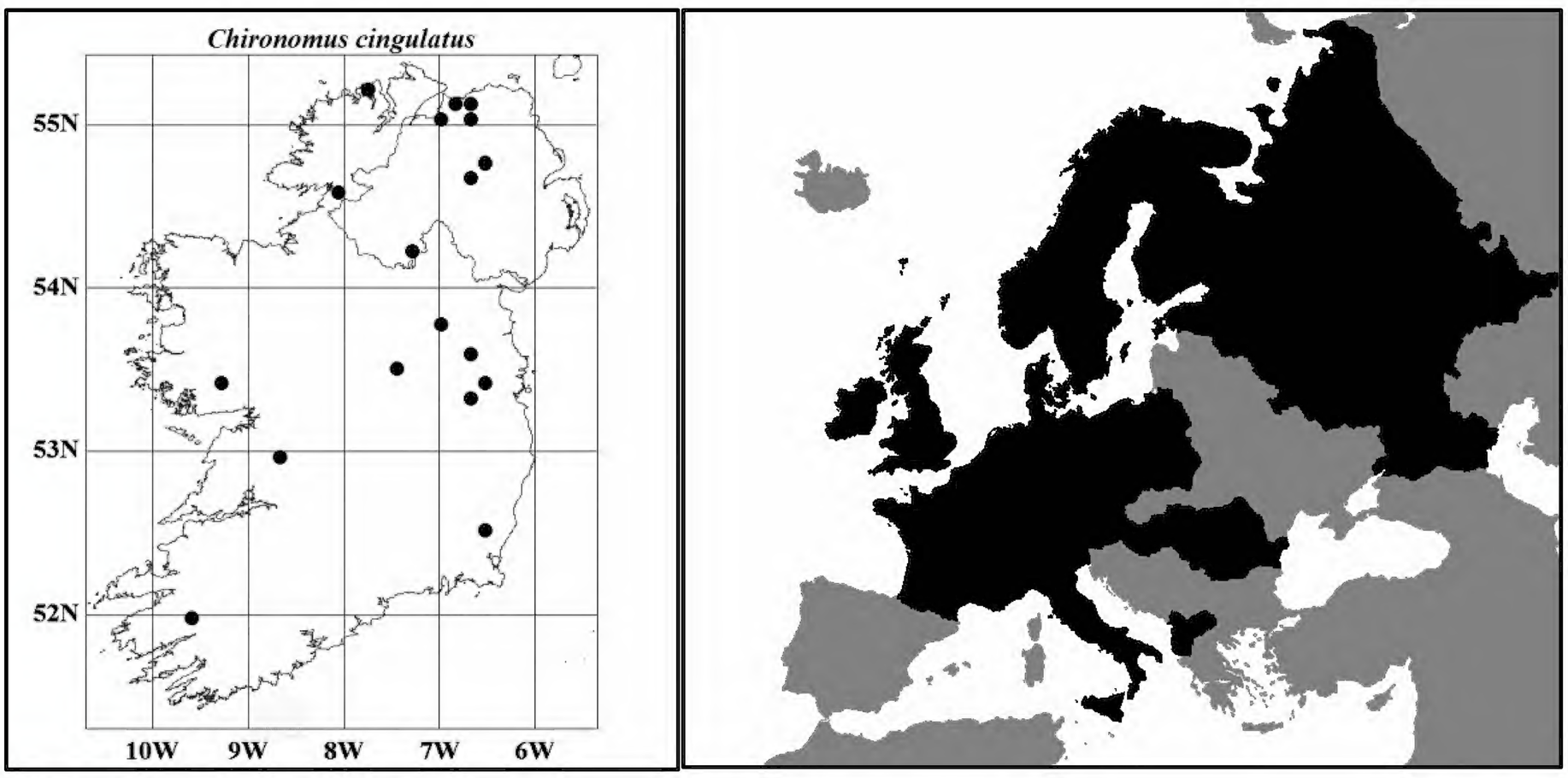
FIGURES 603-604. *Chironomus anthracinus* Zetterstedt, 1860.



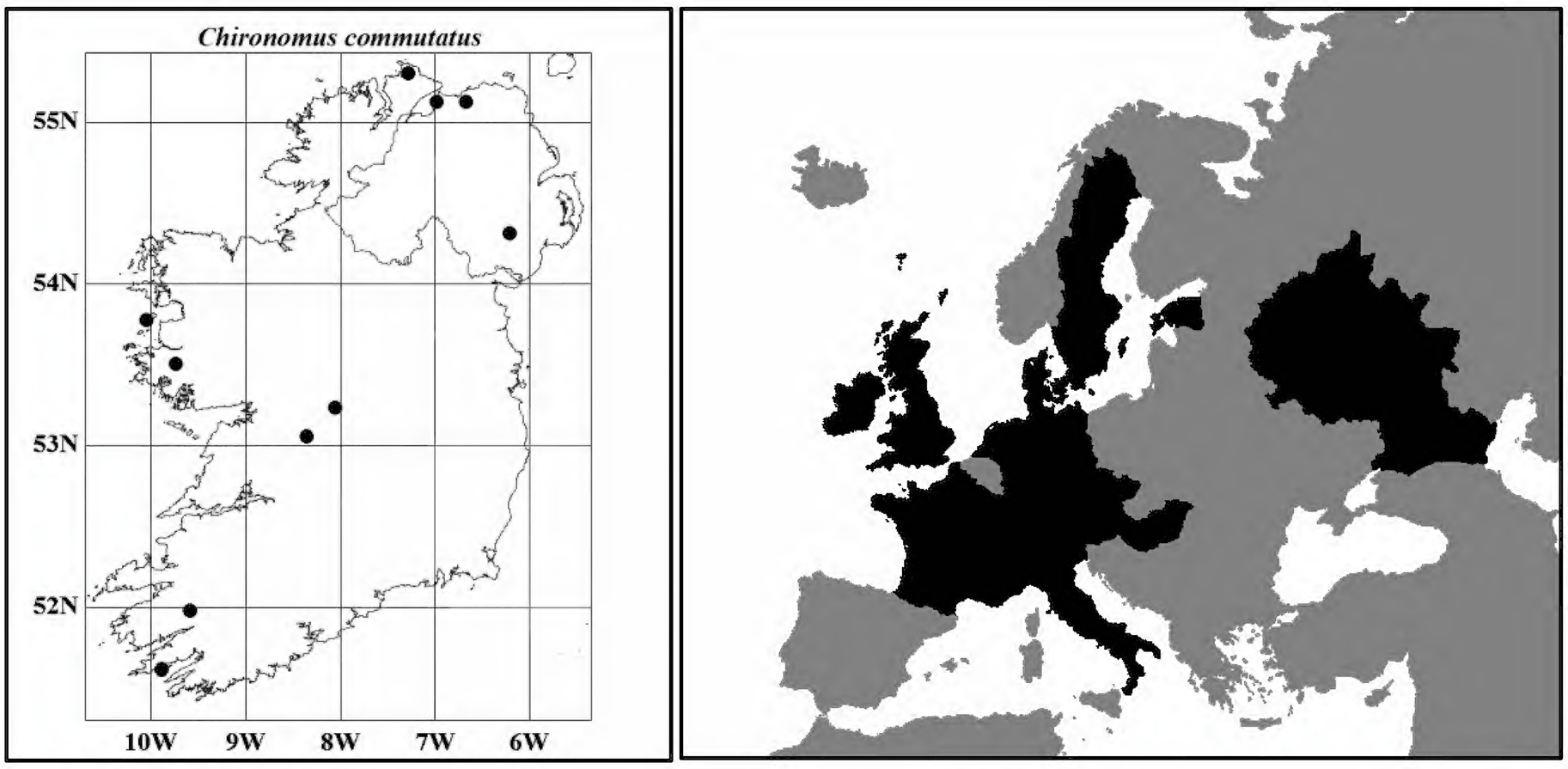
FIGURES 605-606. *Chironomus aprilinus* Meigen, 1818.



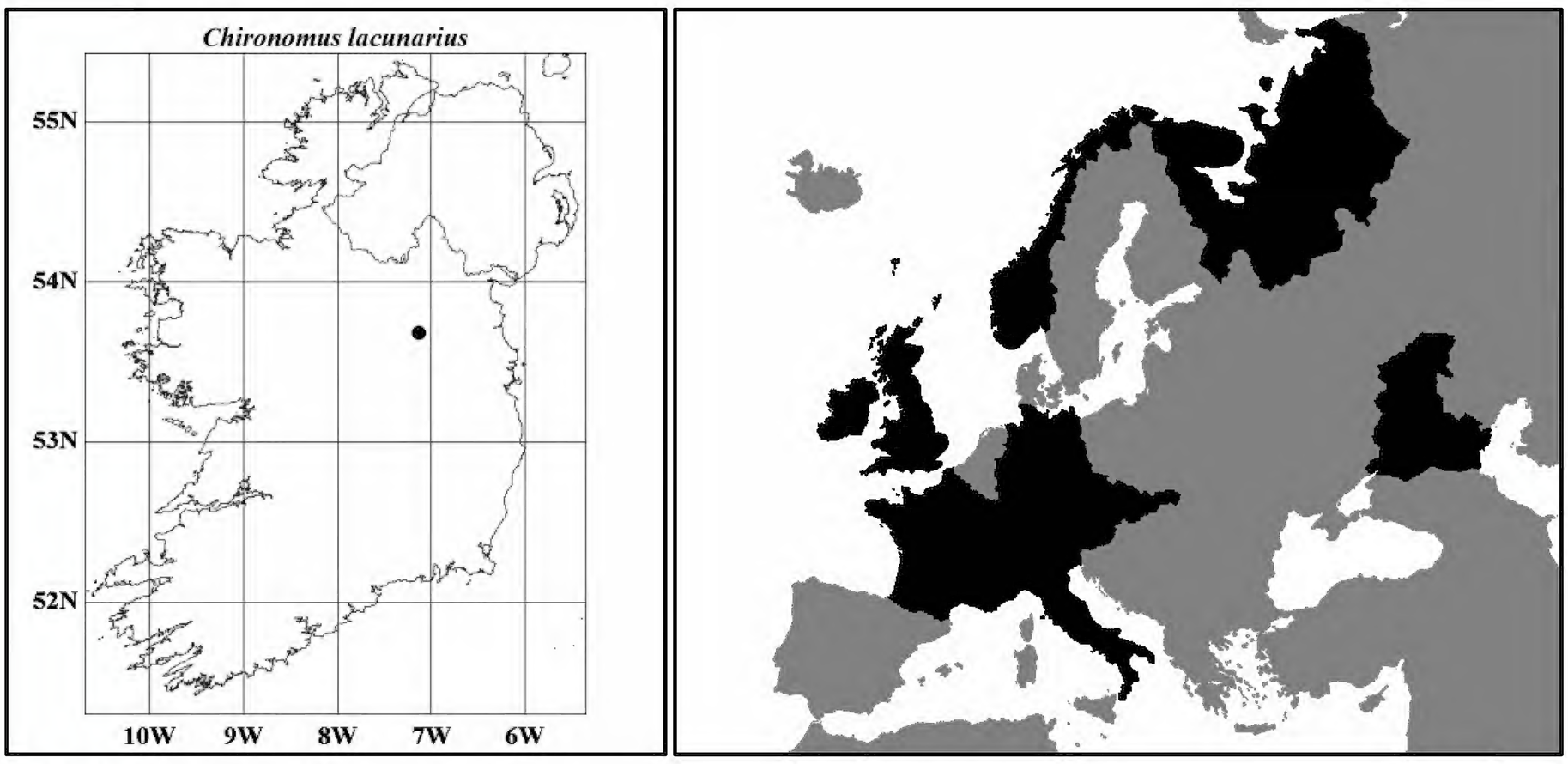
FIGURES 607-608. *Chironomus bernensis* Kloetzli, 1973.



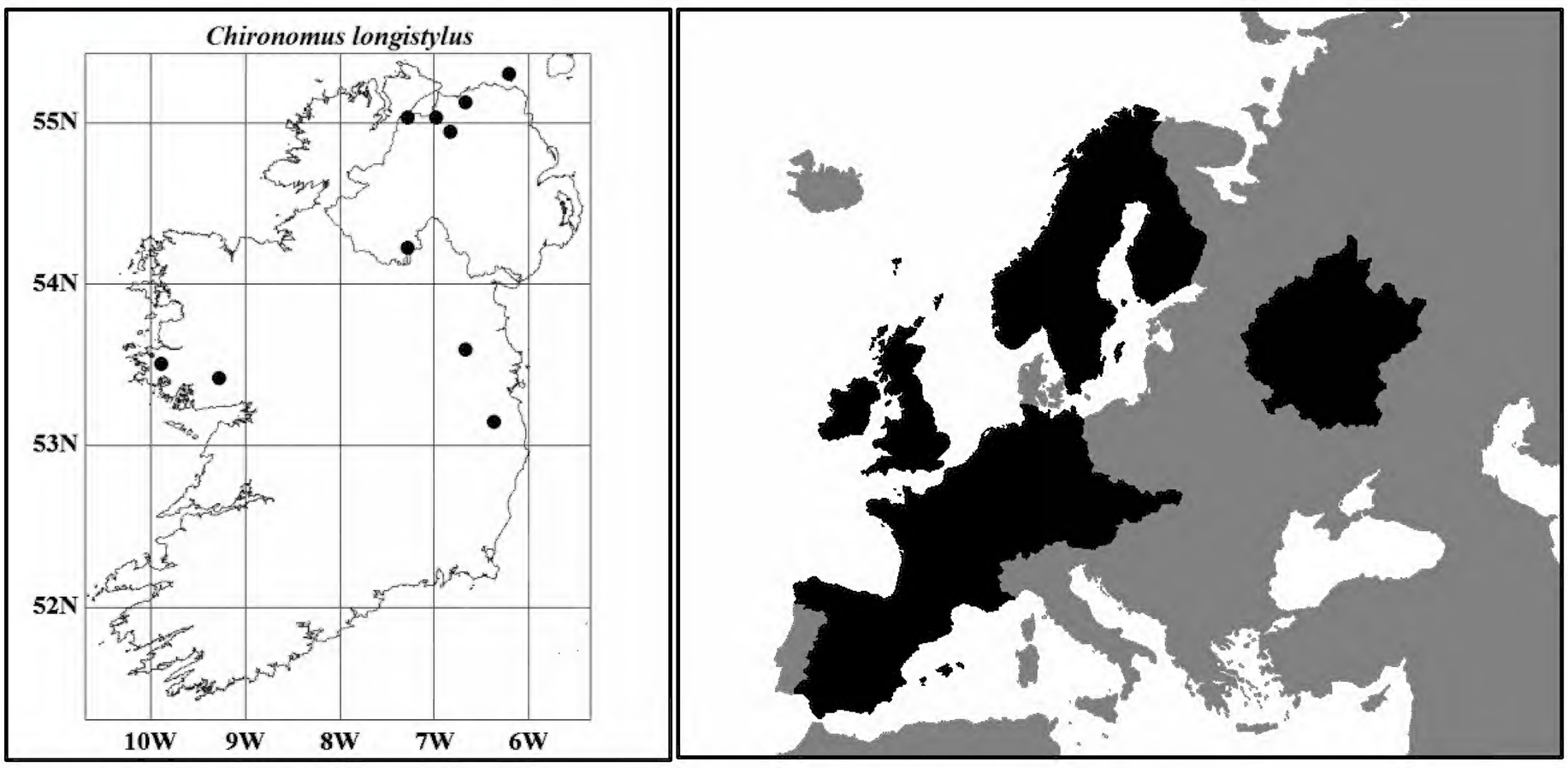
FIGURES 609-610. *Chironomus cingulatus* Meigen, 1830.



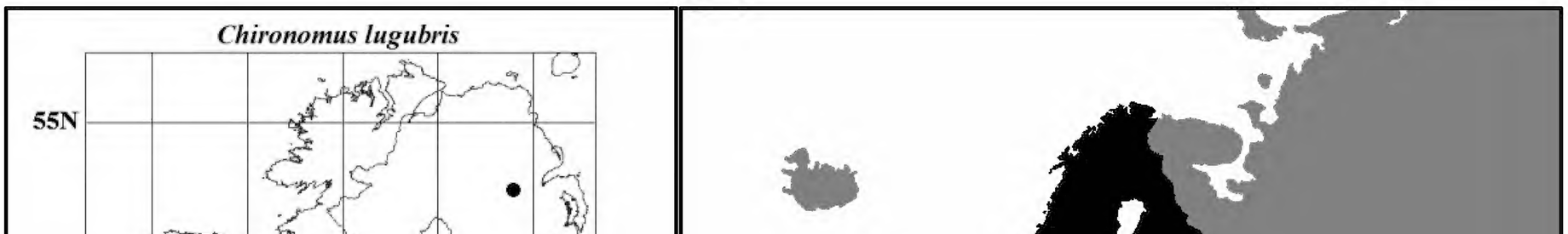
FIGURES 611-612. *Chironomus commutatus* Keyl, 1960.



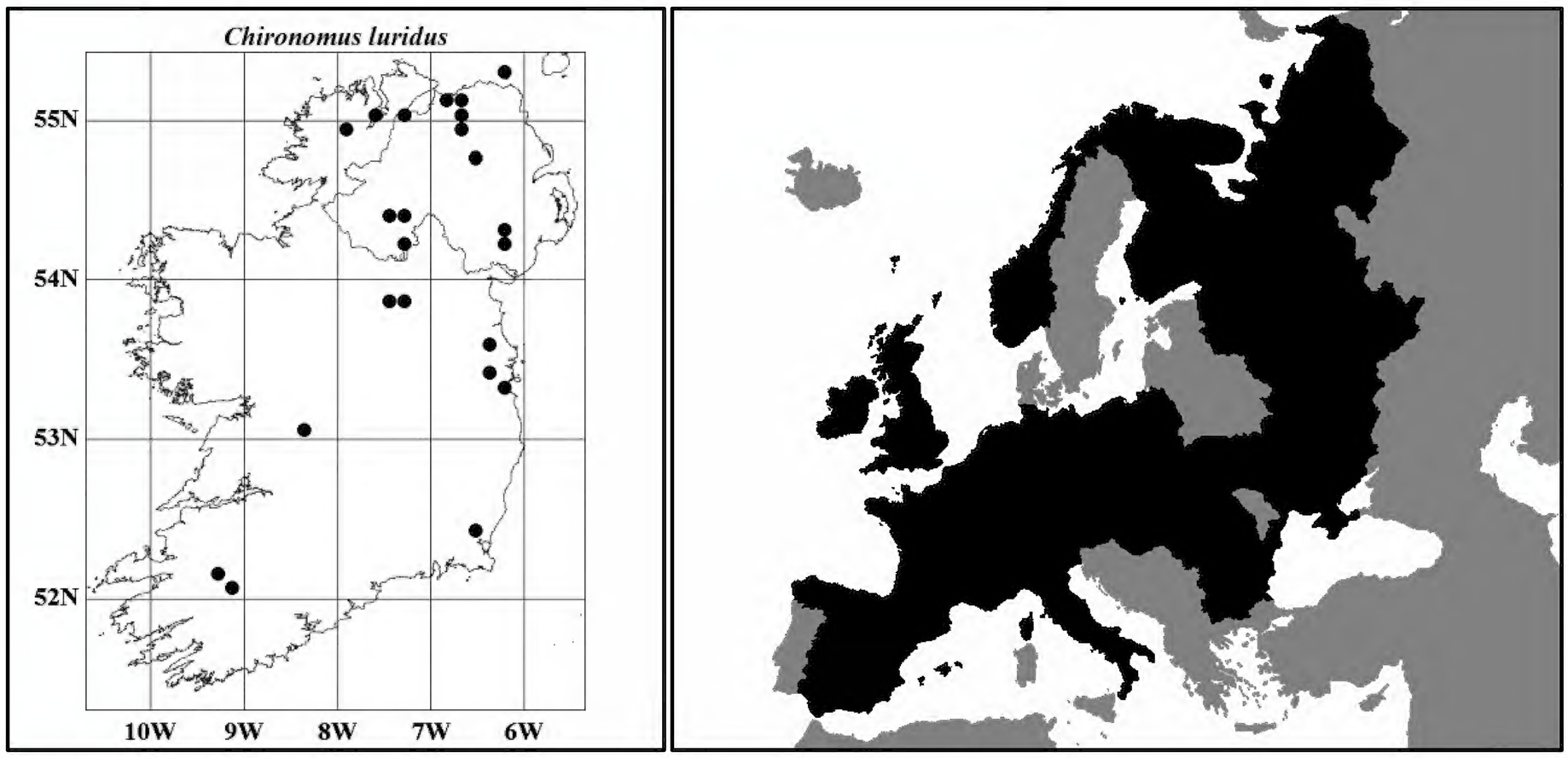
FIGURES 613-614. *Chironomus lacunarius* Wülker, 1973.



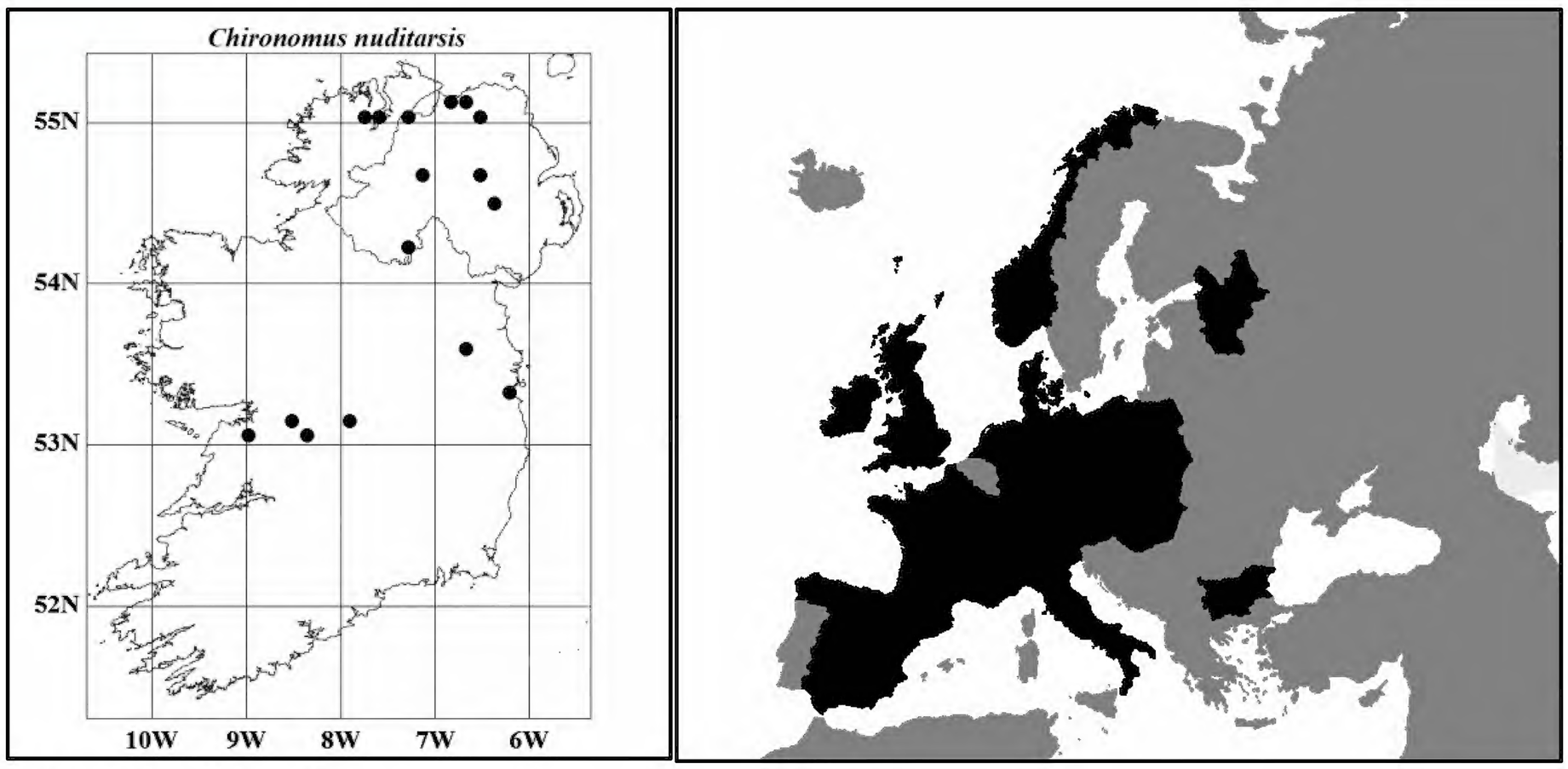
FIGURES 615-616. *Chironomus longistylus* Goetghebuer, 1921.



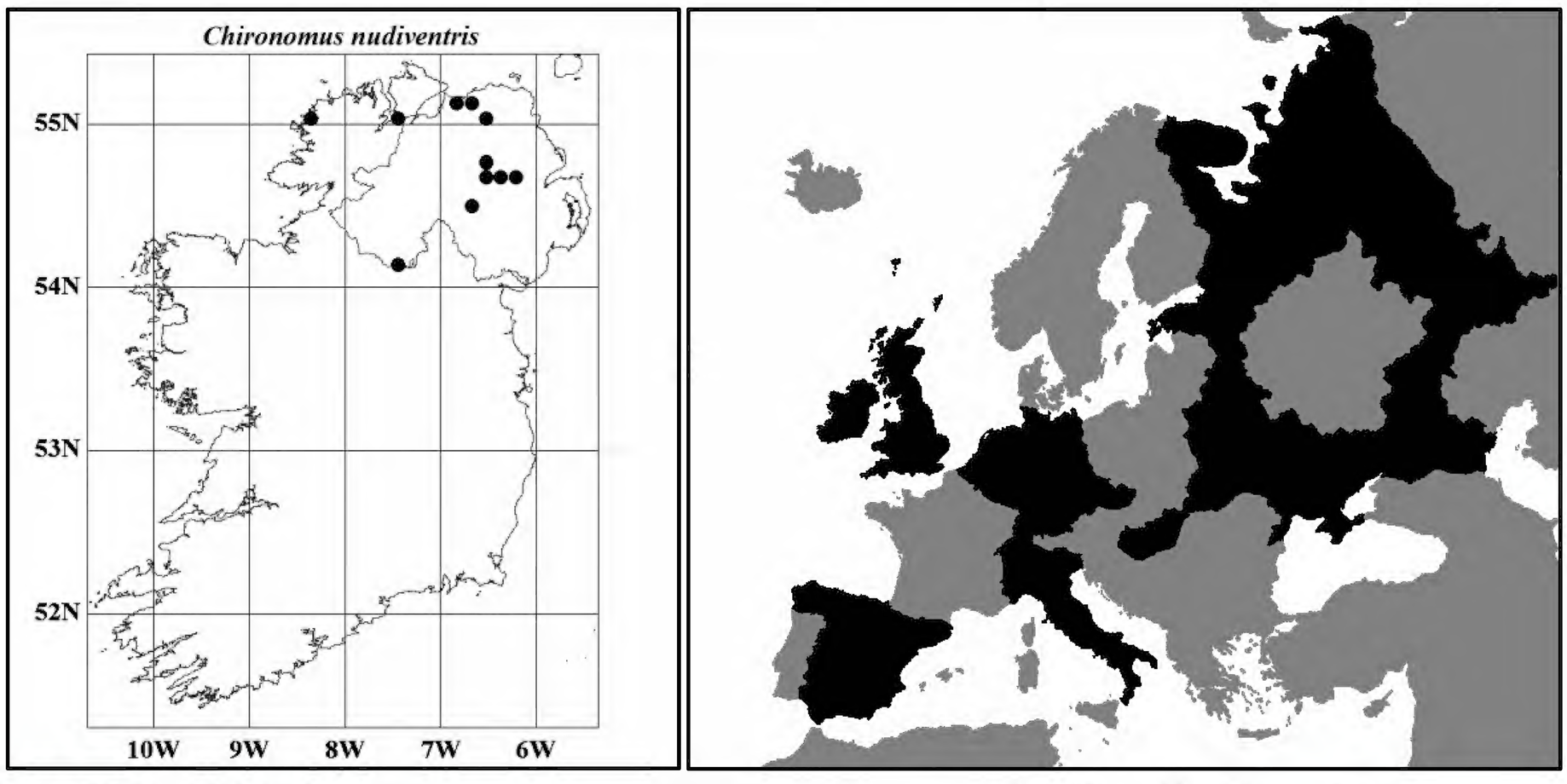
FIGURES 617-618. *Chironomus lugubris* Zetterstedt. 1850.



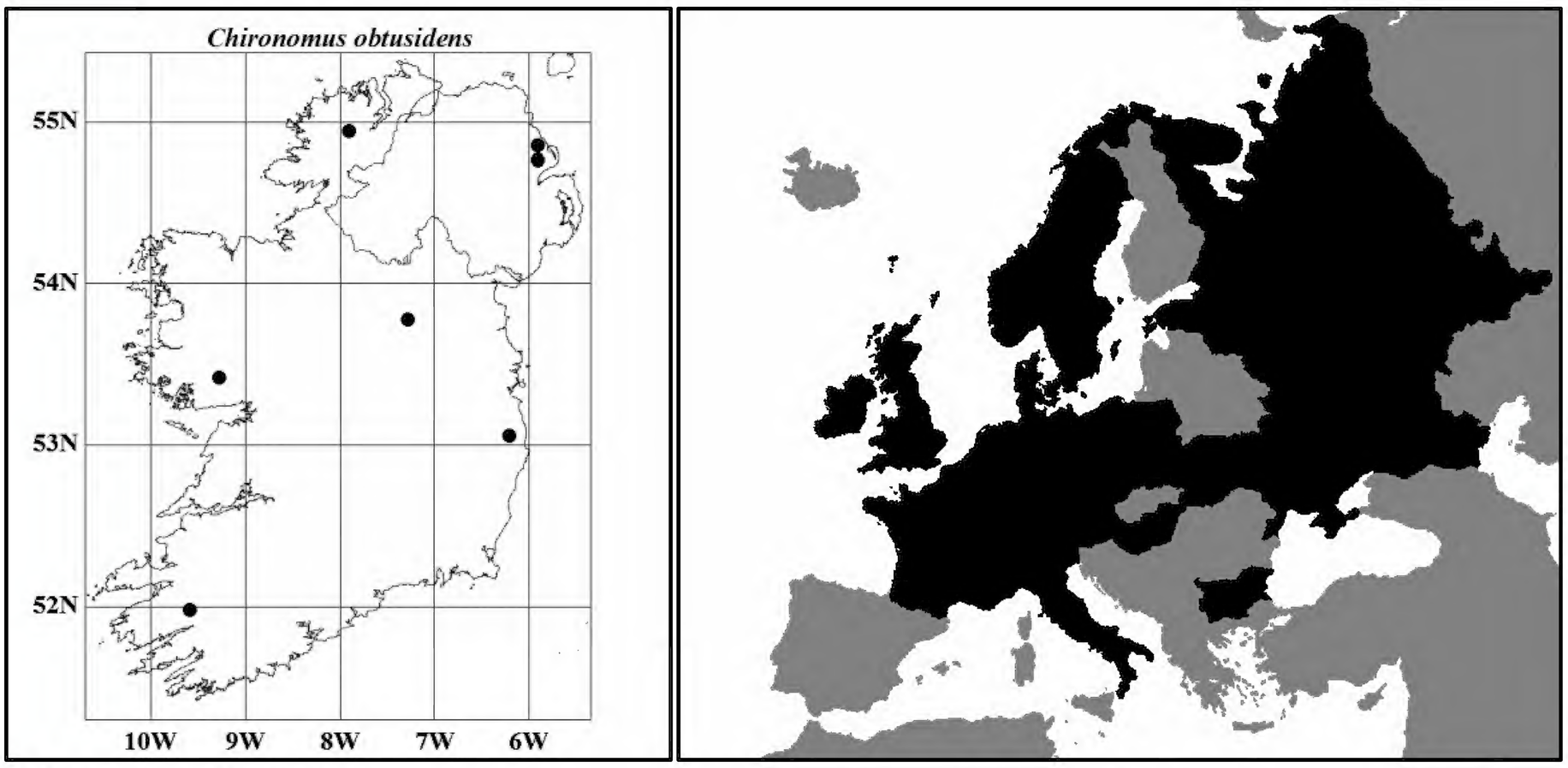
FIGURES 619-620. *Chironomus luridus* Strenzke, 1959.



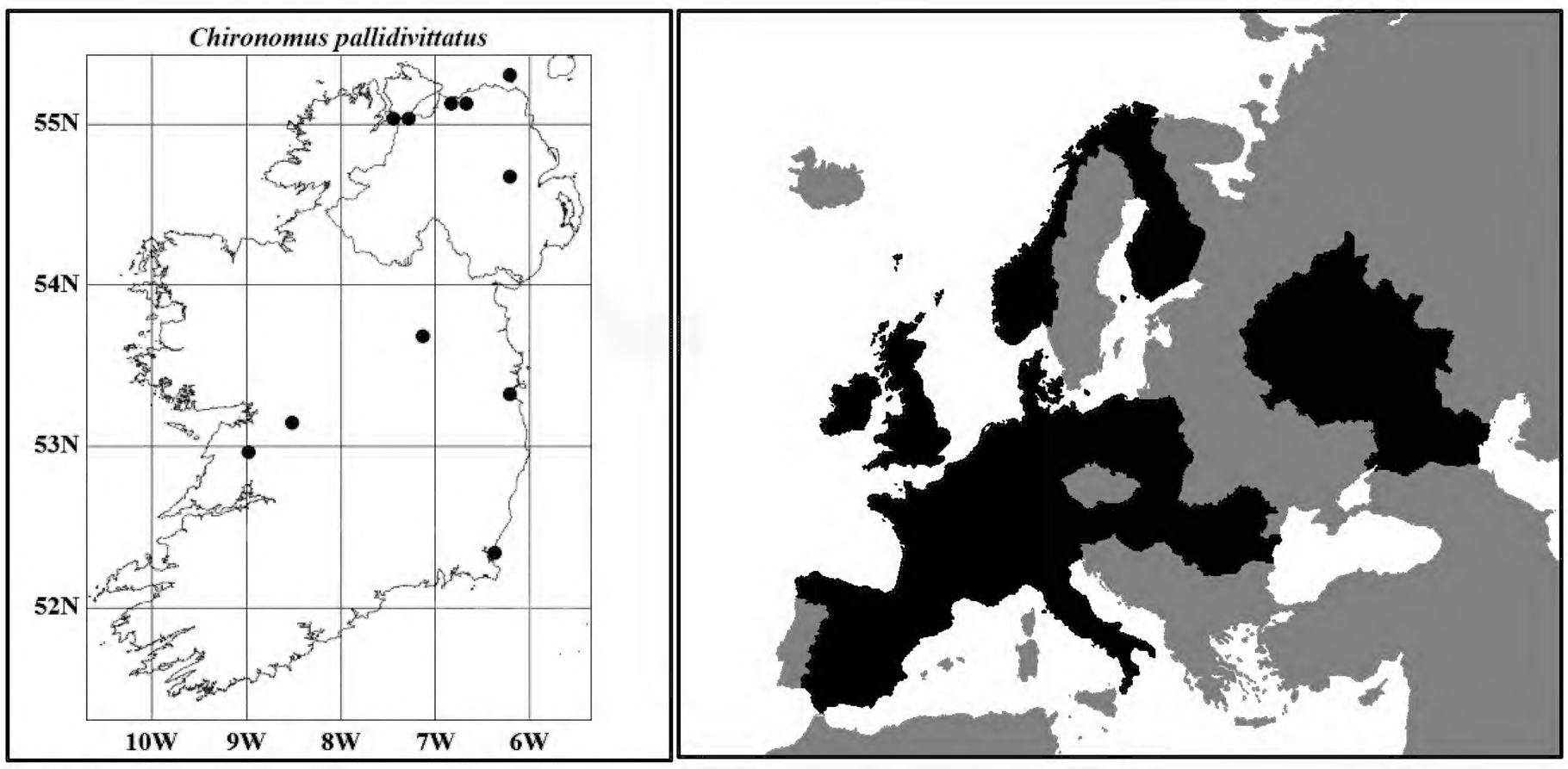
FIGURES 621-622. *Chironomus nuditarsis* Keyl, 1961.



FIGURES 623-624. *Chironomus nudiventris* Ryser, Scholl & Wülker, 1983.

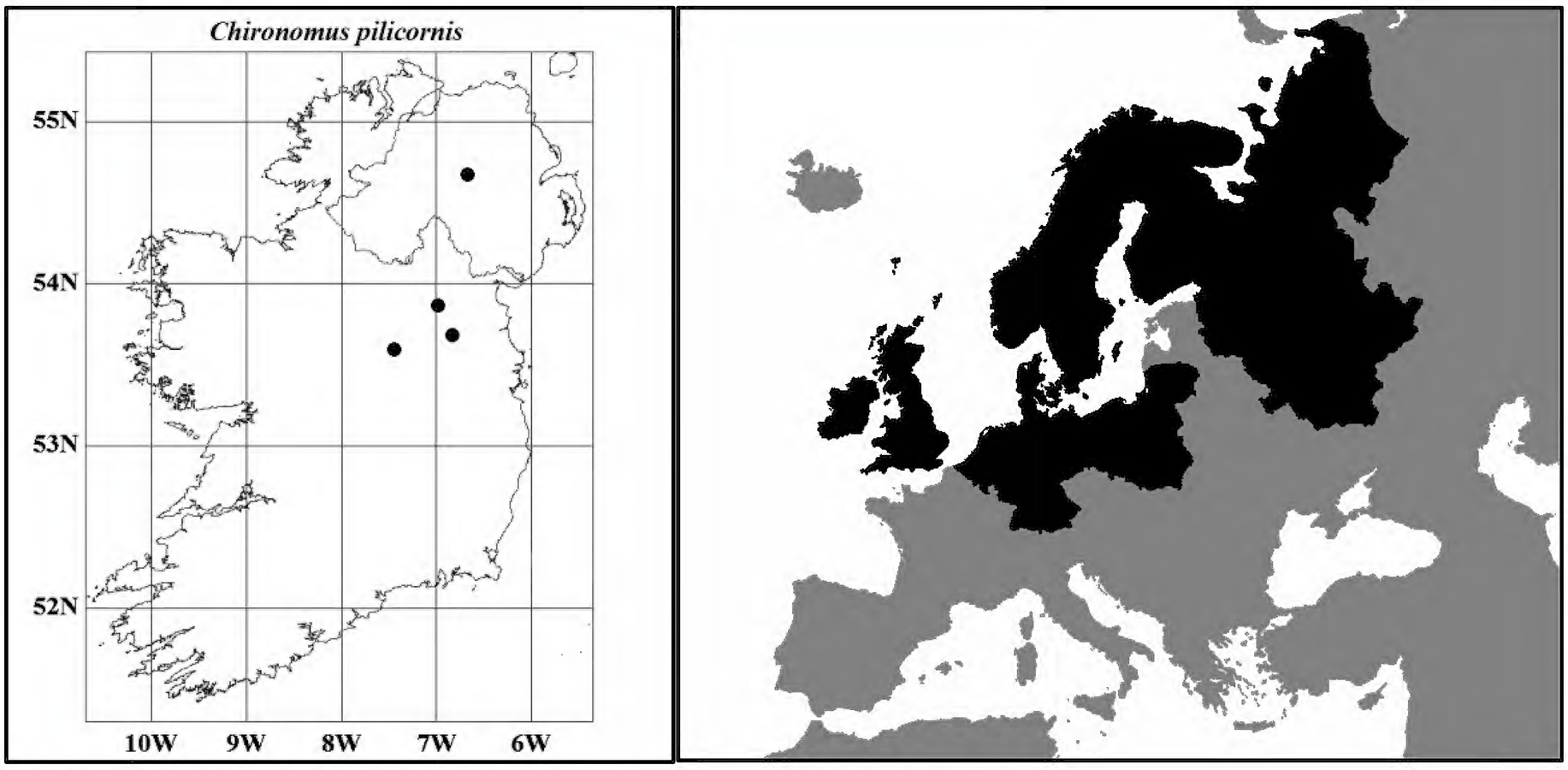


FIGURES 625-626. *Chironomus obtusidens* Goetghebuer, 1921.

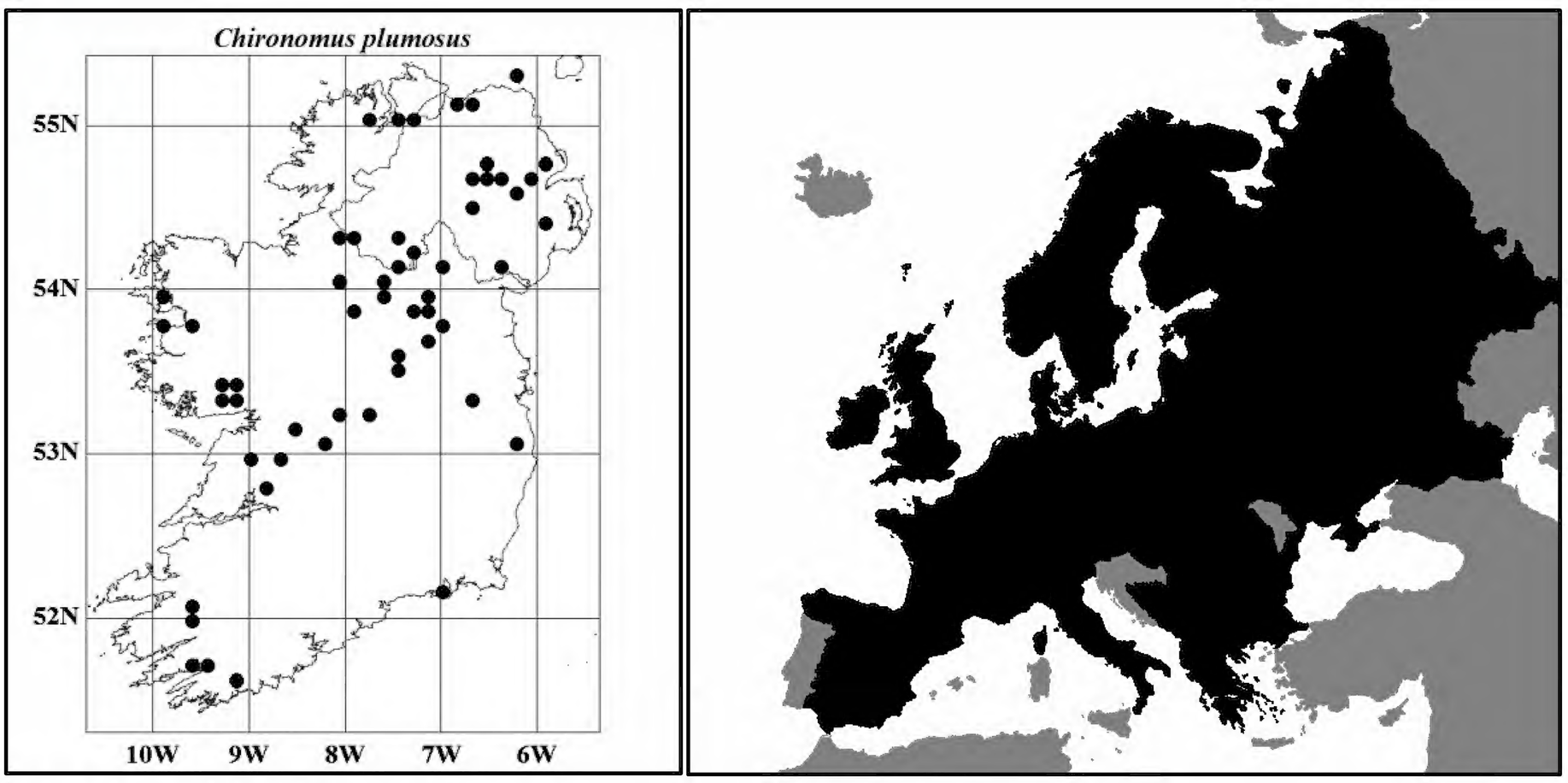


FIGURES 627-628. *Chironomus pallidivittatus* Edwards, 1929.

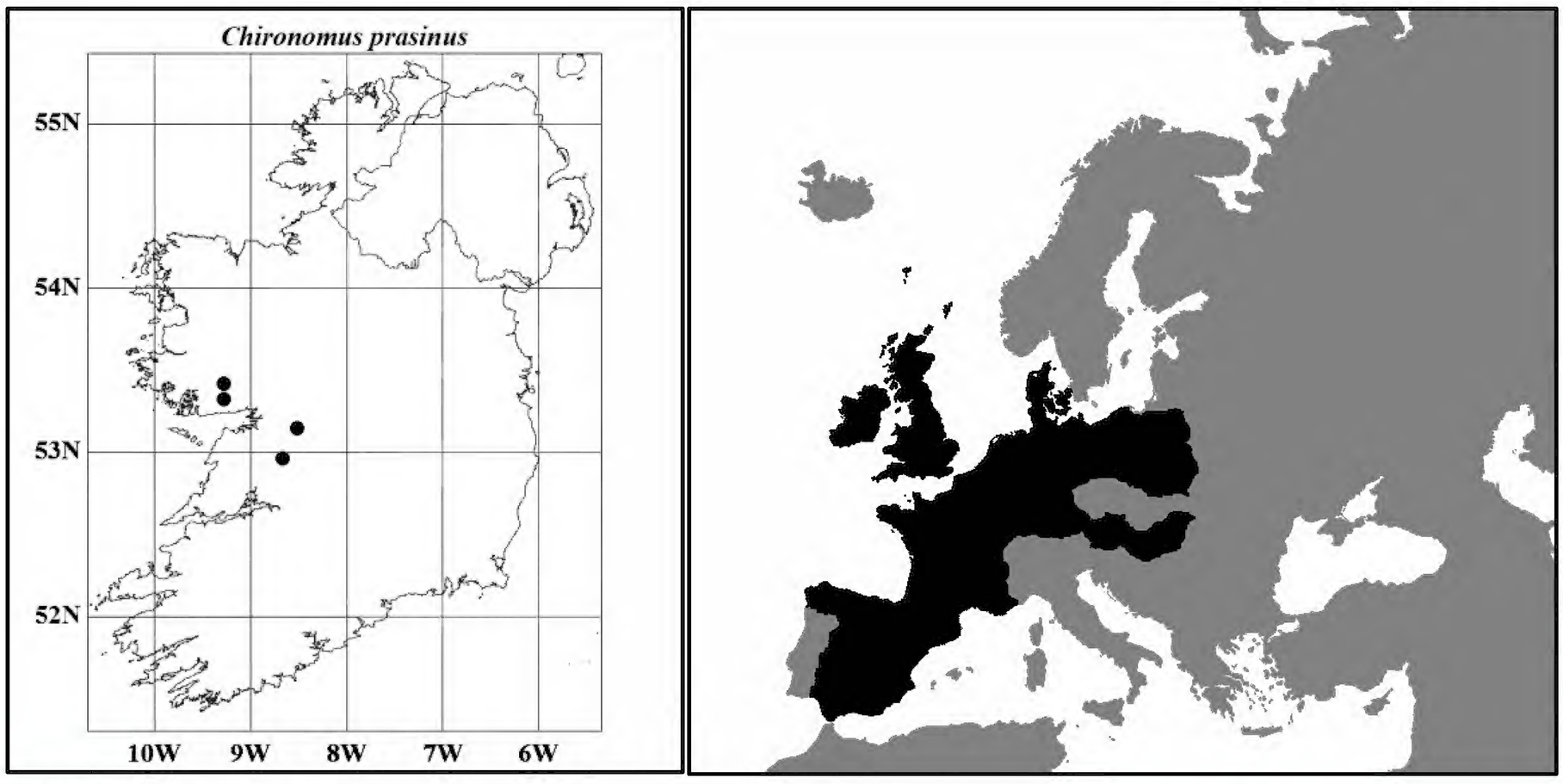
FIGURES 629-630. *Chironomus piger* Strenzke, 1956.



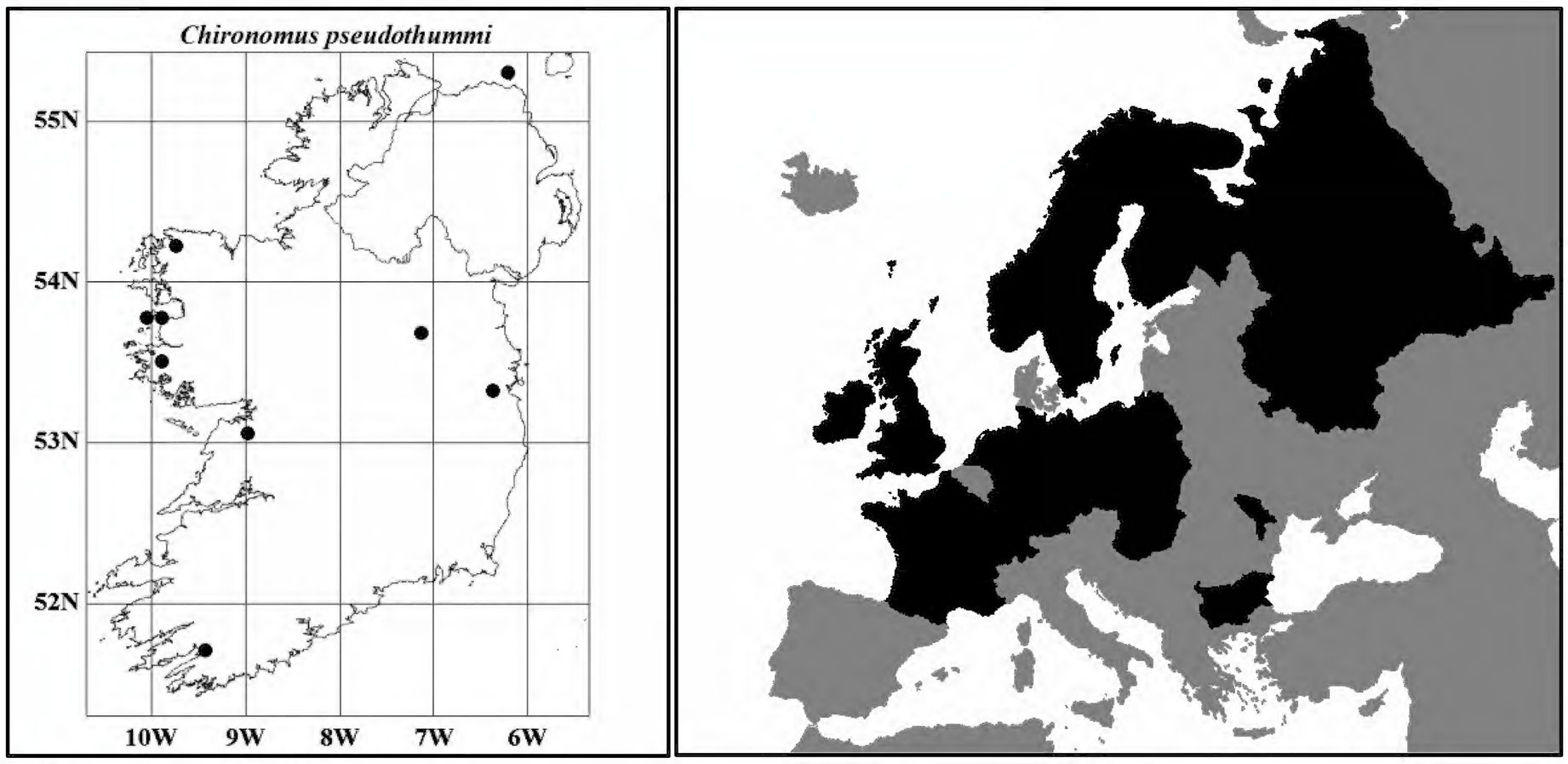
FIGURES 631-632. *Chironomus pilicornis* (Fabricius, 1787).



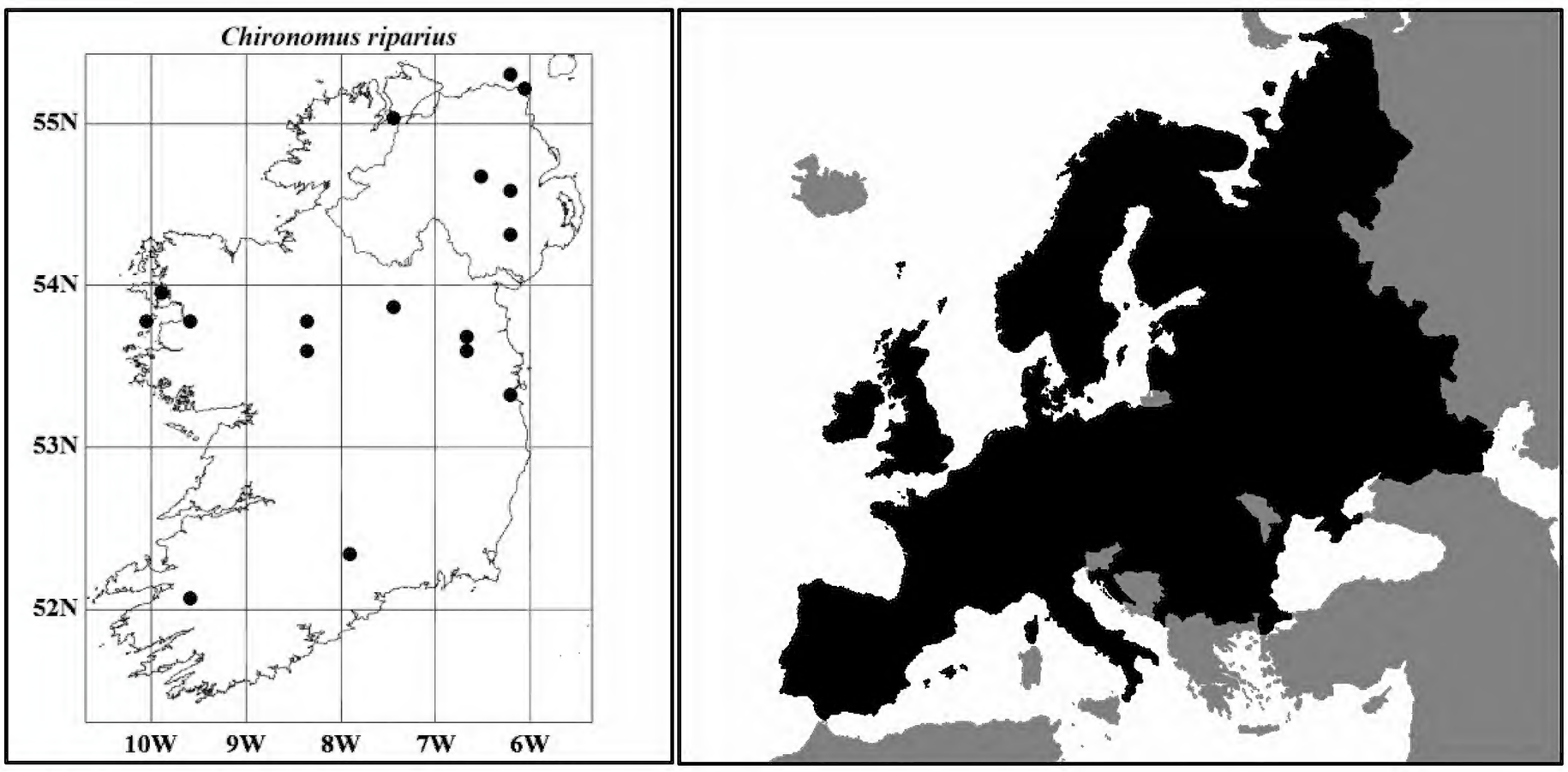
FIGURES 633-634. *Chironomus plumosus* (Linnaeus, 1758).



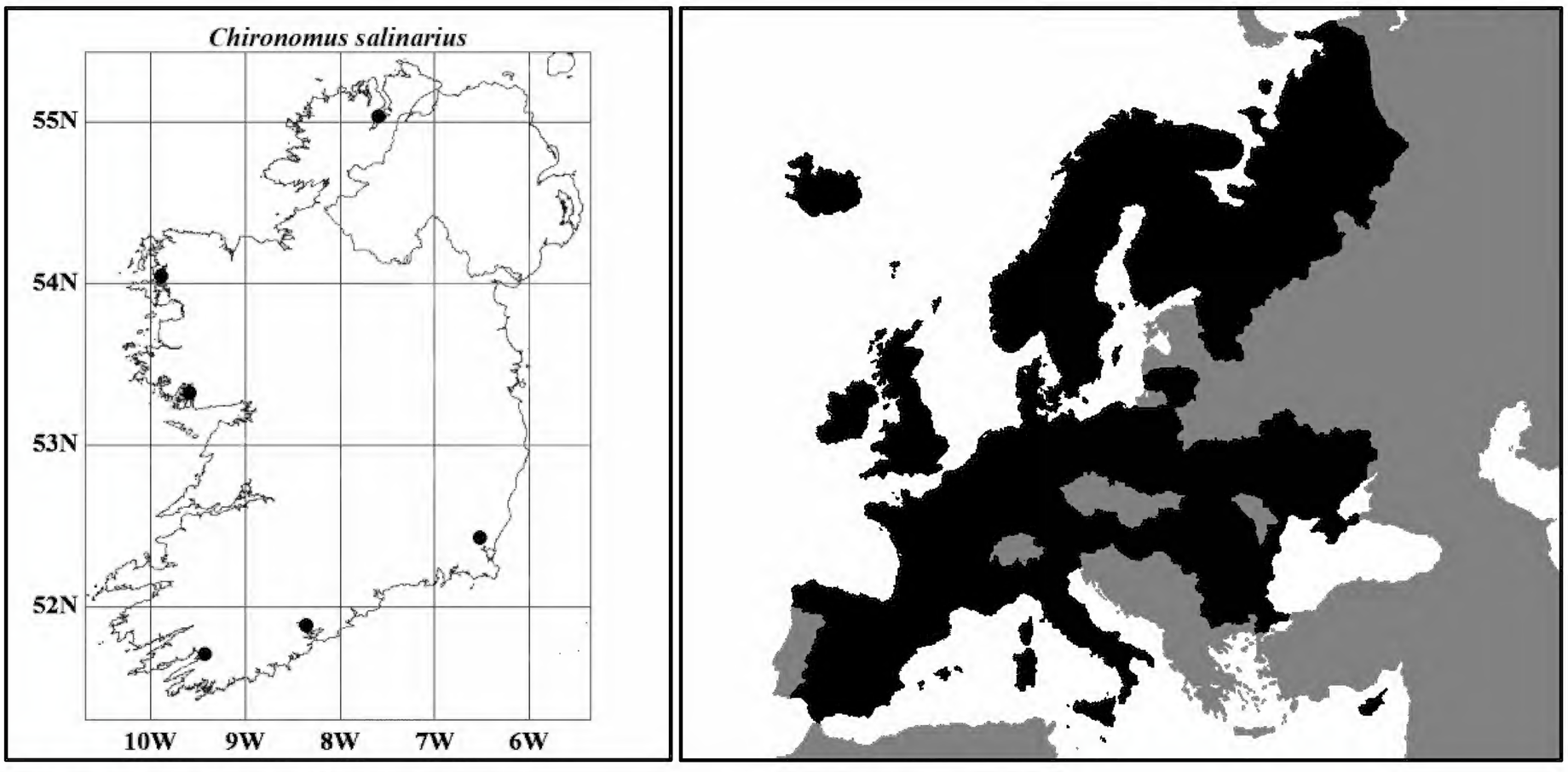
FIGURES 635-636. *Chironomus prasinus* Meigen sensu Pinder, 1978



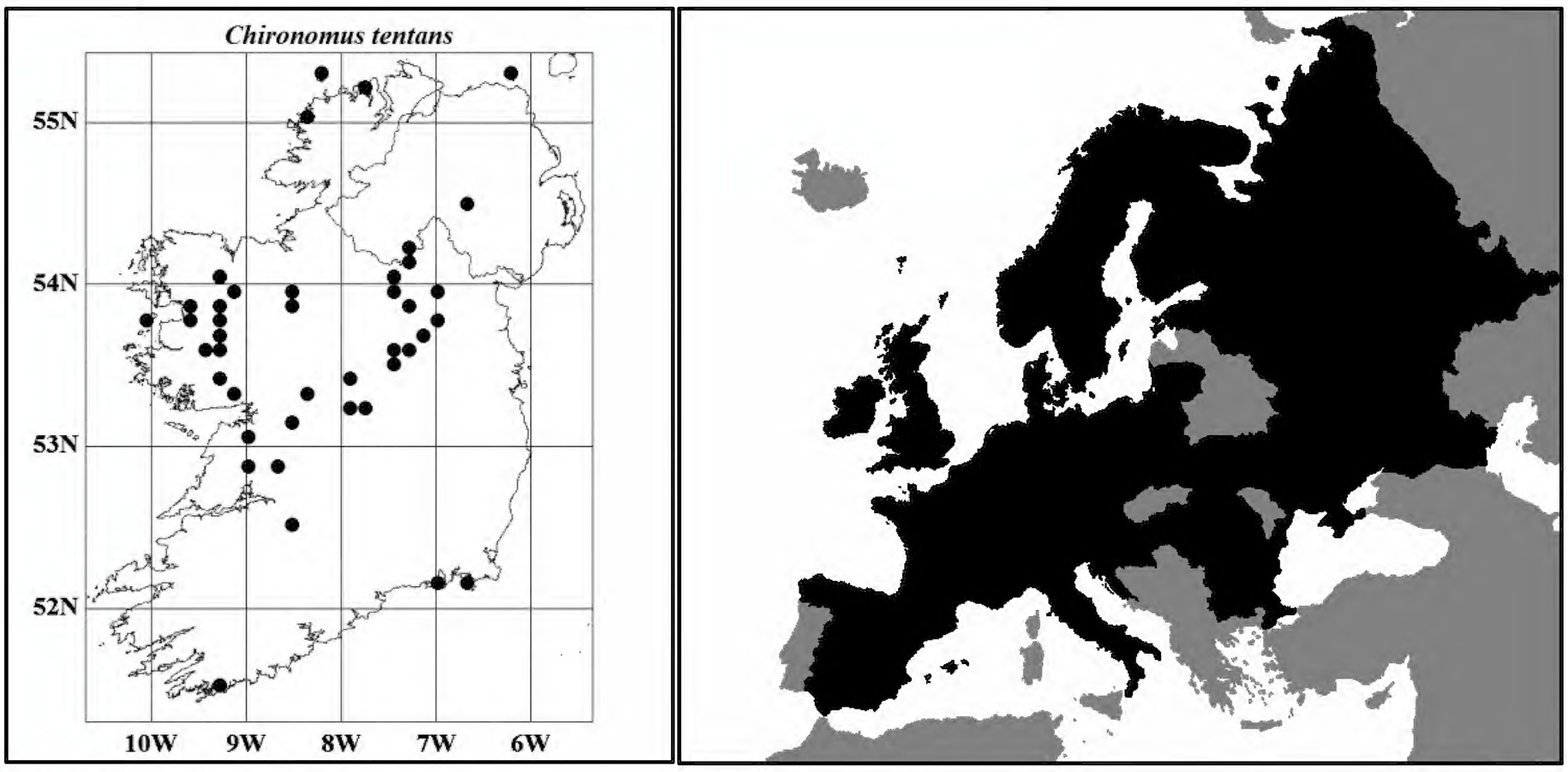
FIGURES 637-638. *Chironomus pseudothummi* Strenzke, 1959.



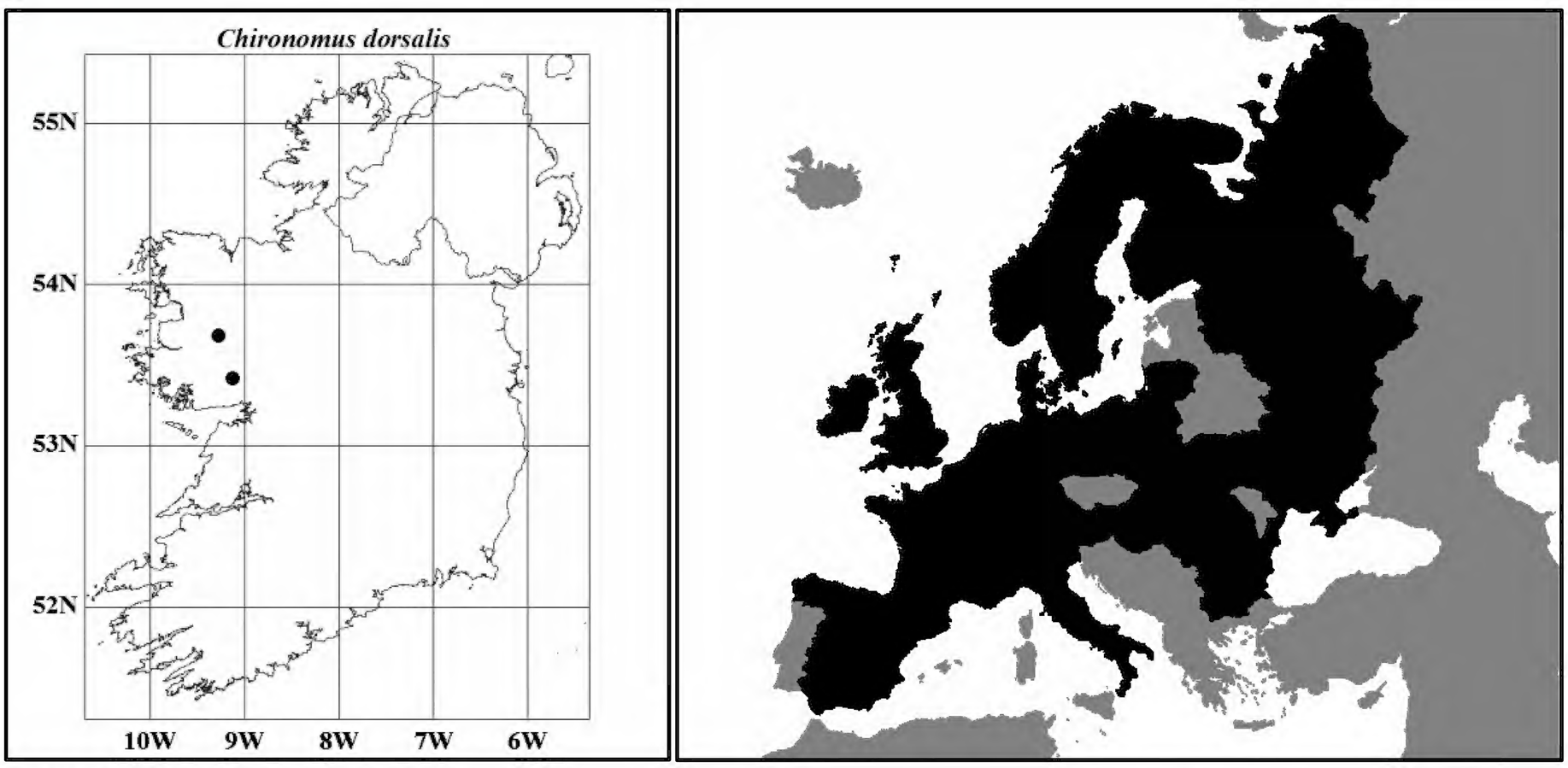
FIGURES 639-640. *Chironomus riparius* Meigen, 1804.



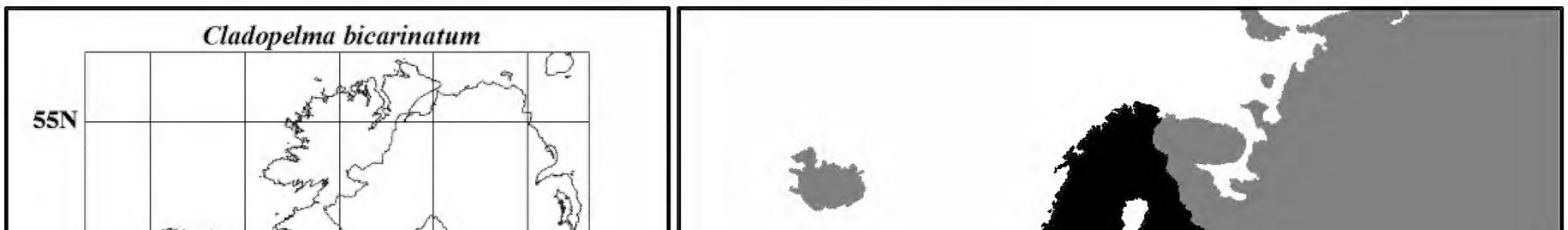
FIGURES 641-642. *Chironomus salinarius* Kieffer, 1915.



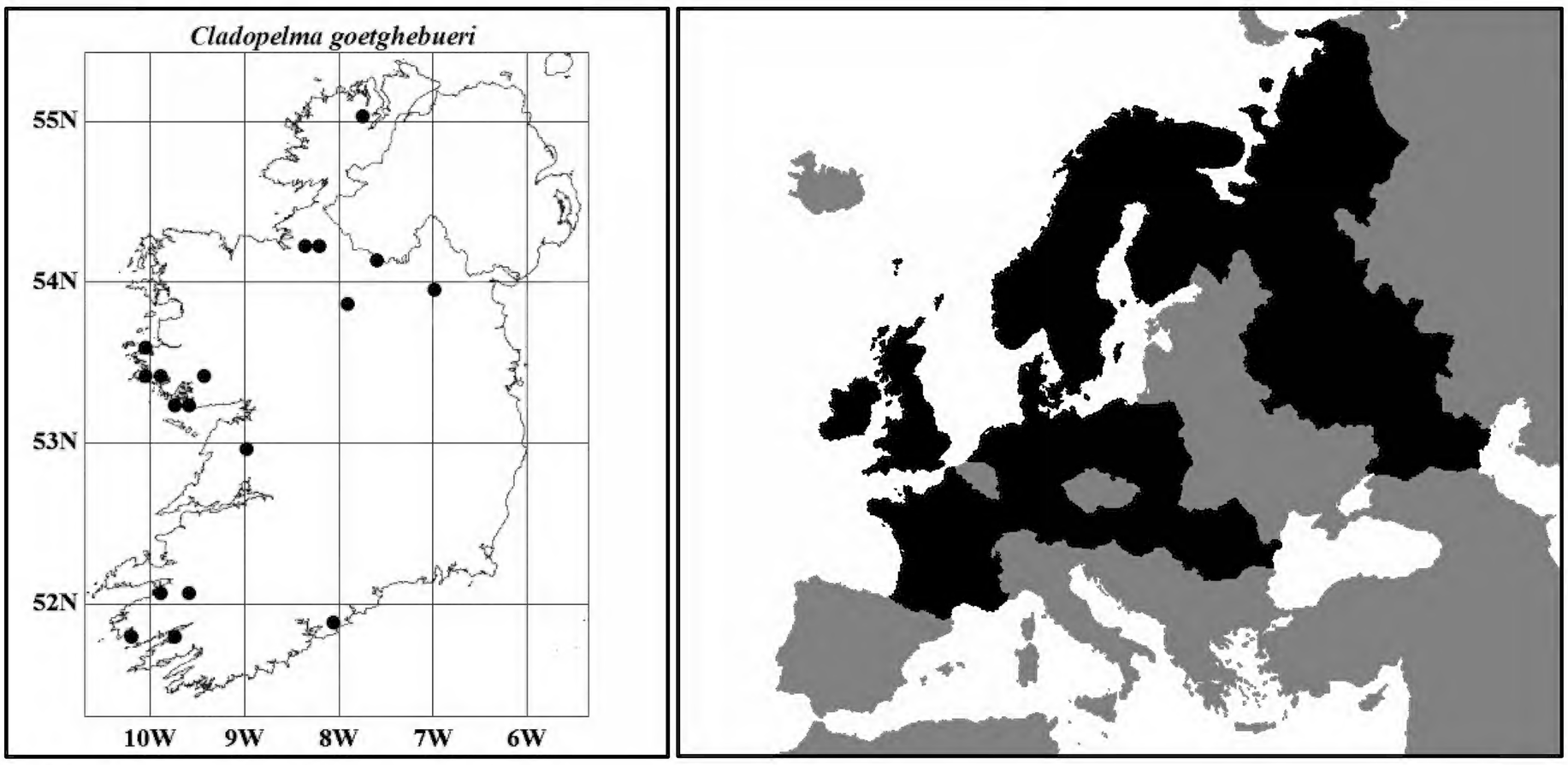
FIGURES 643-644. *Chironomus tentans* Fabricius, 1805.



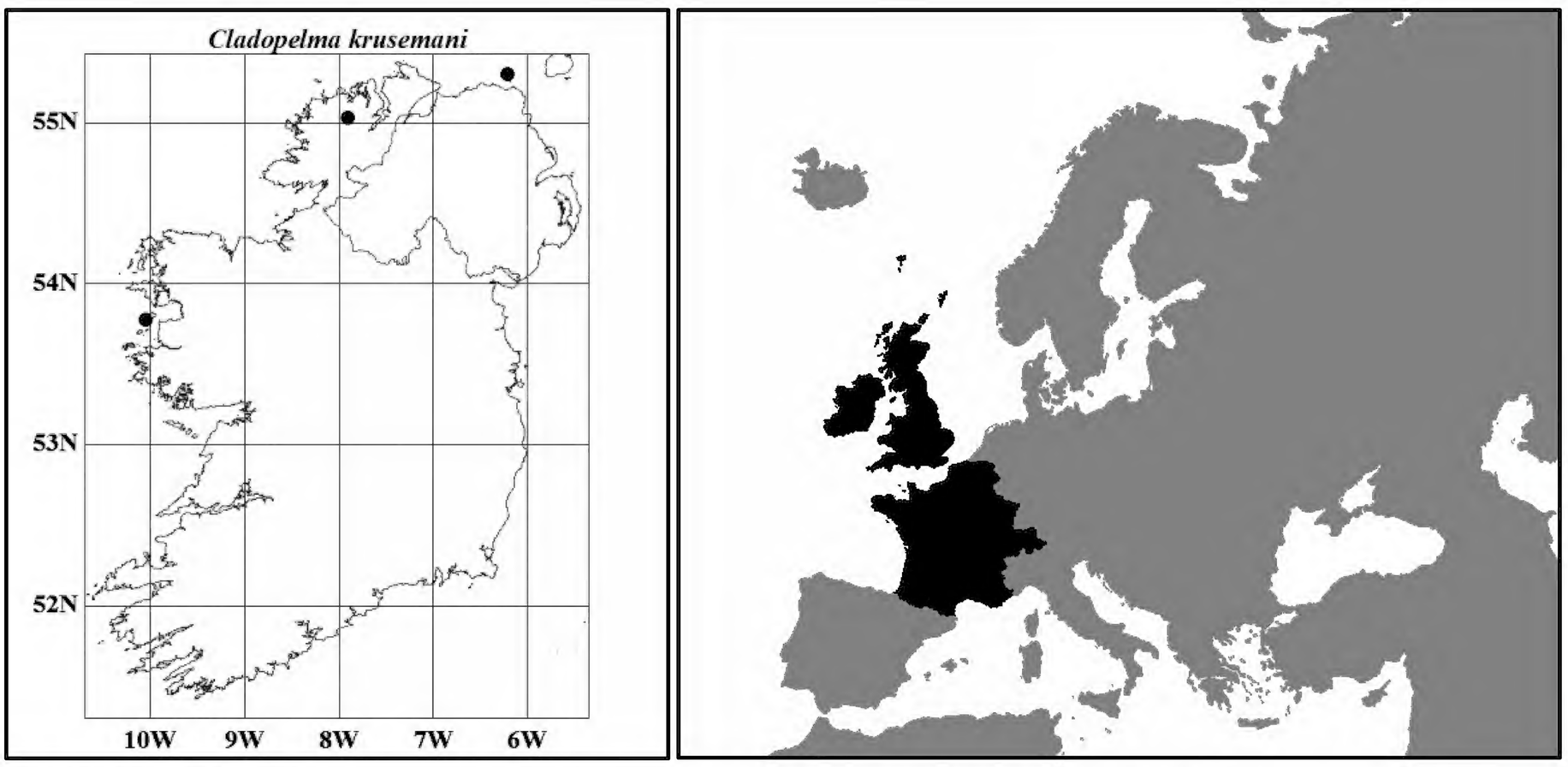
FIGURES 645-646. *Chironomus* (*Lobochironomus*) *dorsalis* Meigen, 1818.



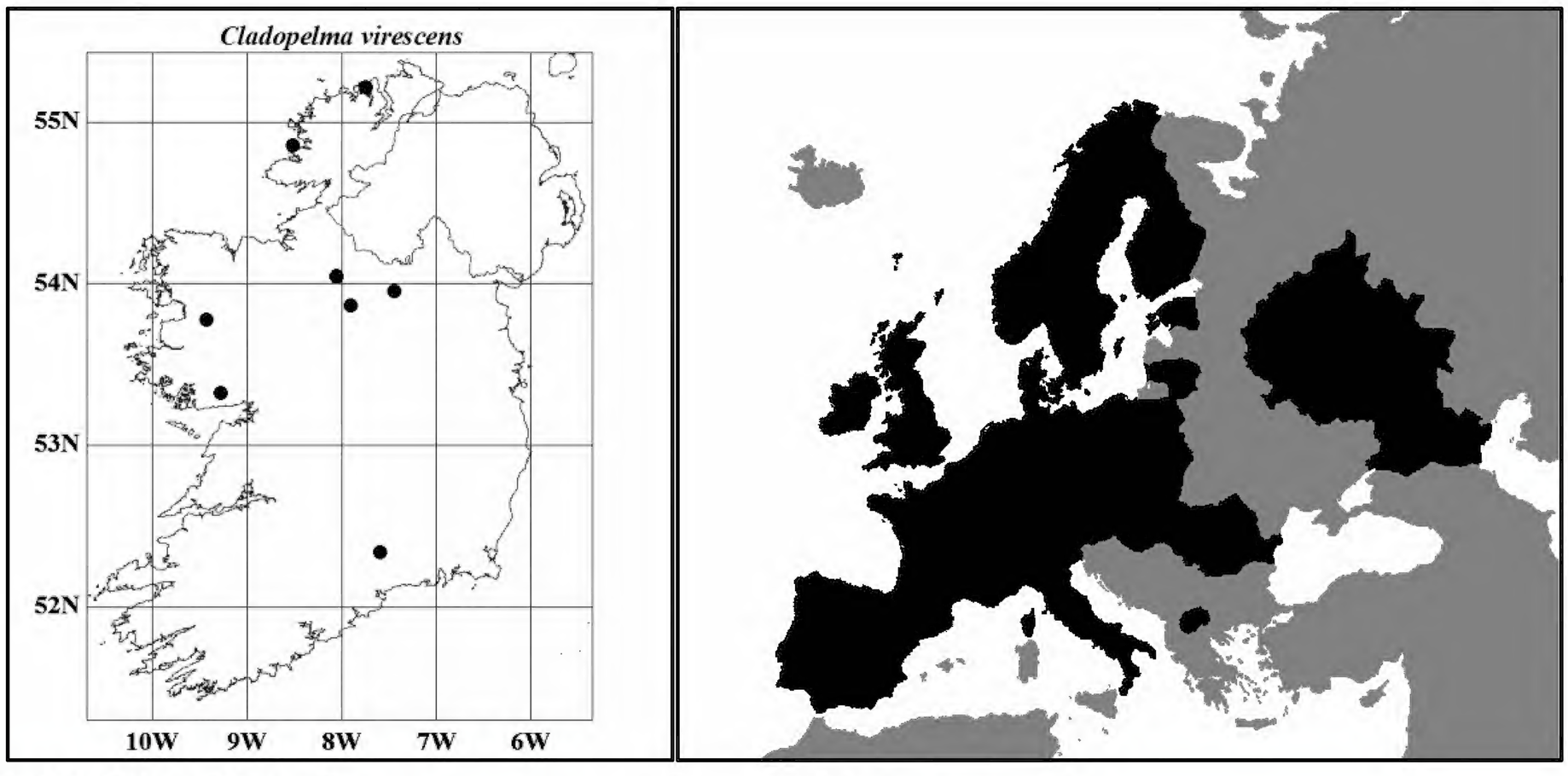
FIGURES 647-648. *Cladopelma bicarinatum* (Brundin, 1947).



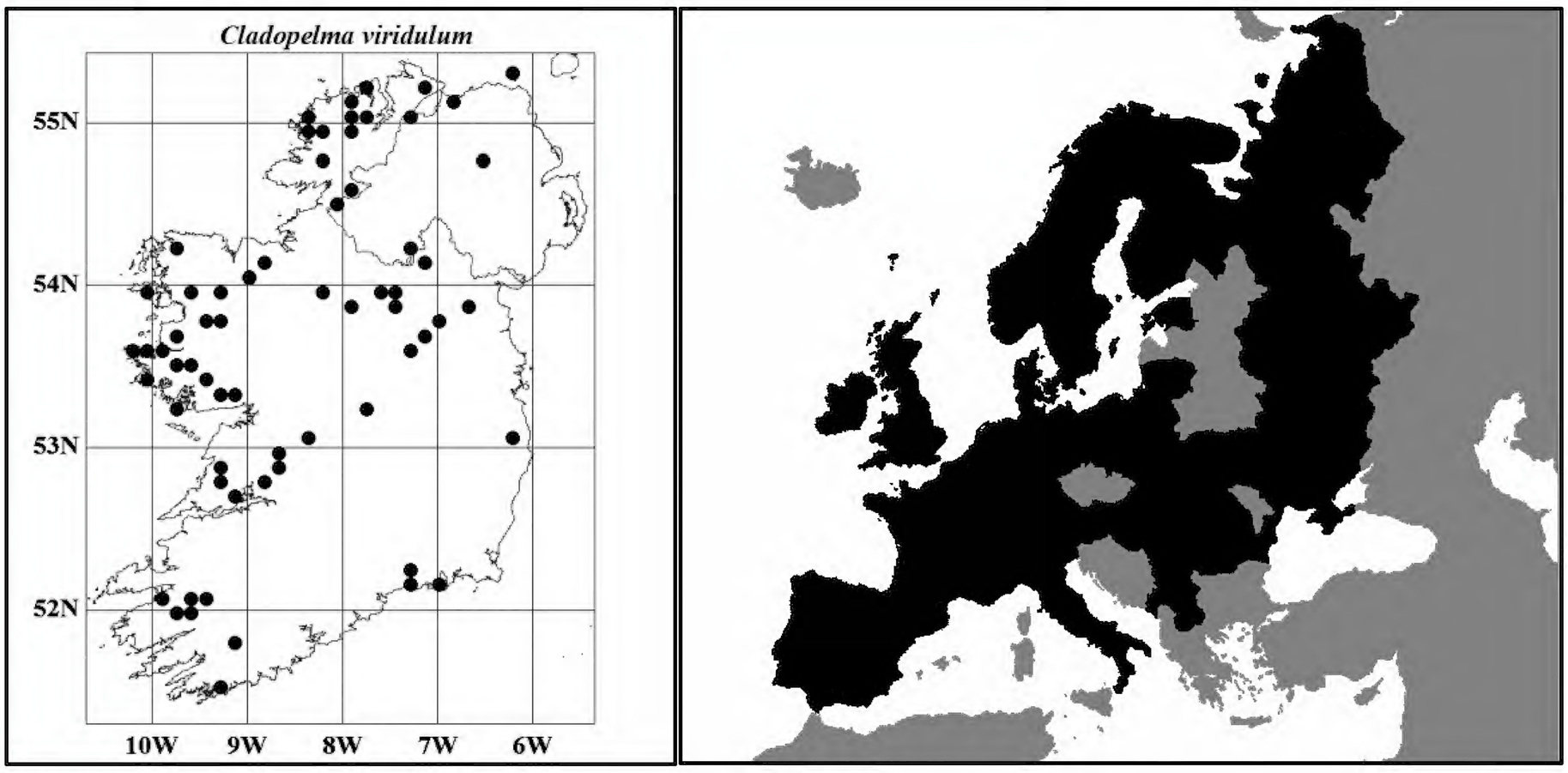
FIGURES 649-650. *Cladopelma goetghebueri* Spies & Sæther, 2004.



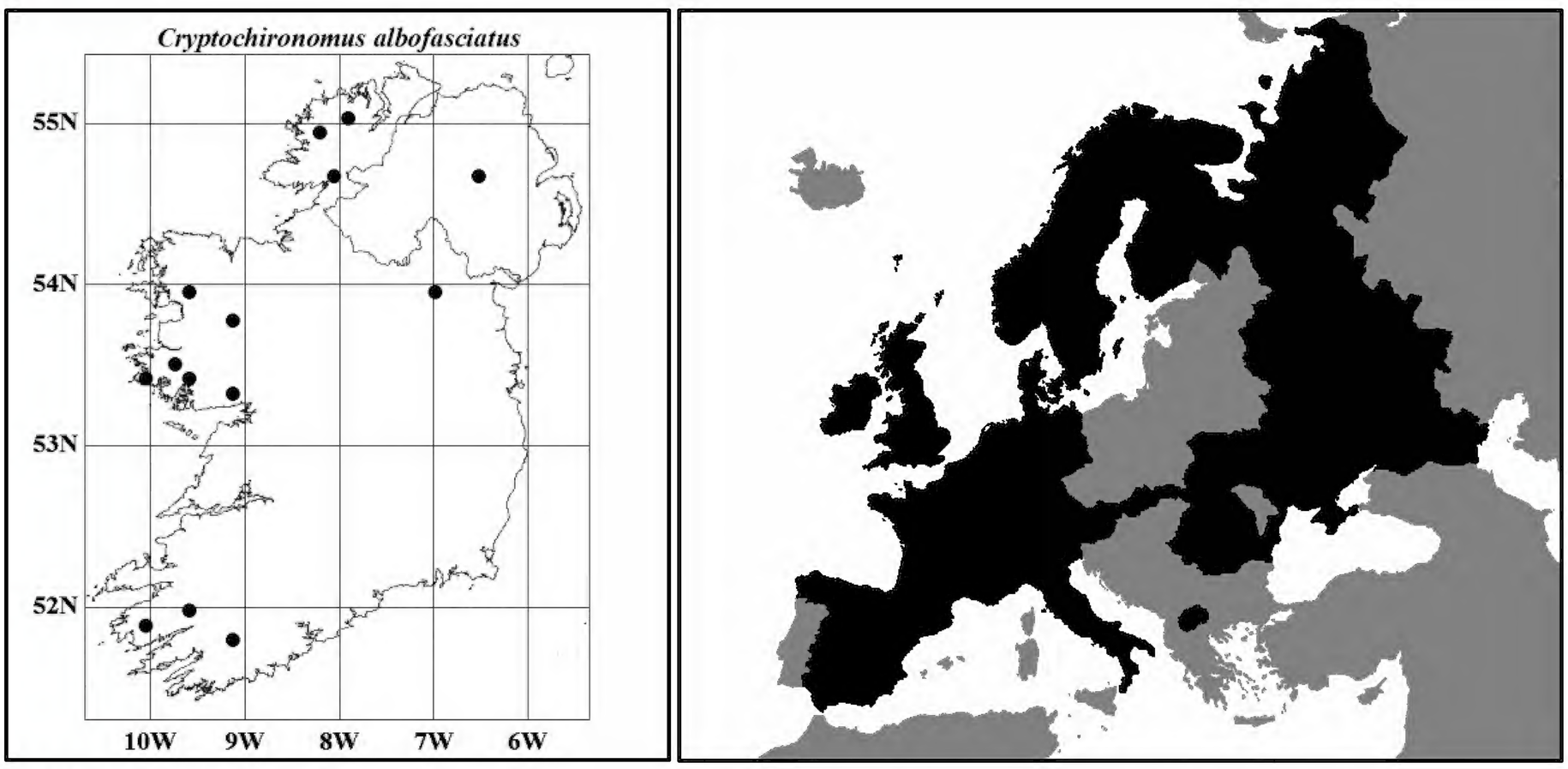
FIGURES 651-652. *Cladopelma krusemani* (Goetghebuer, 1935).



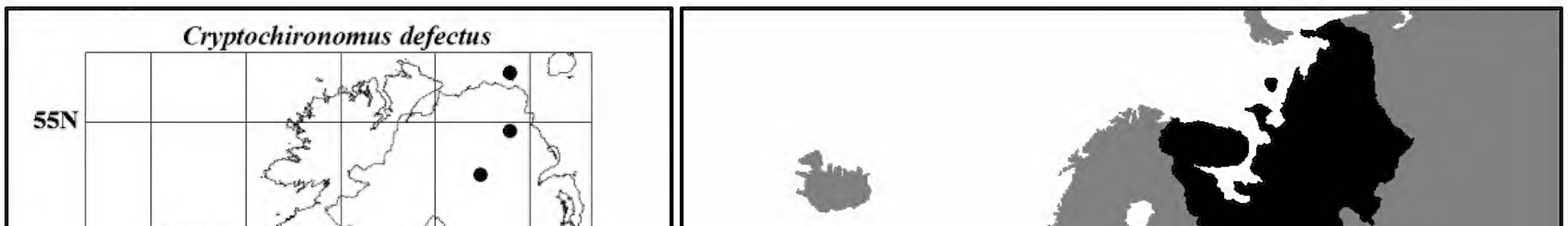
FIGURES 653-654. *Cladopelma virescens* (Meigen, 1818).



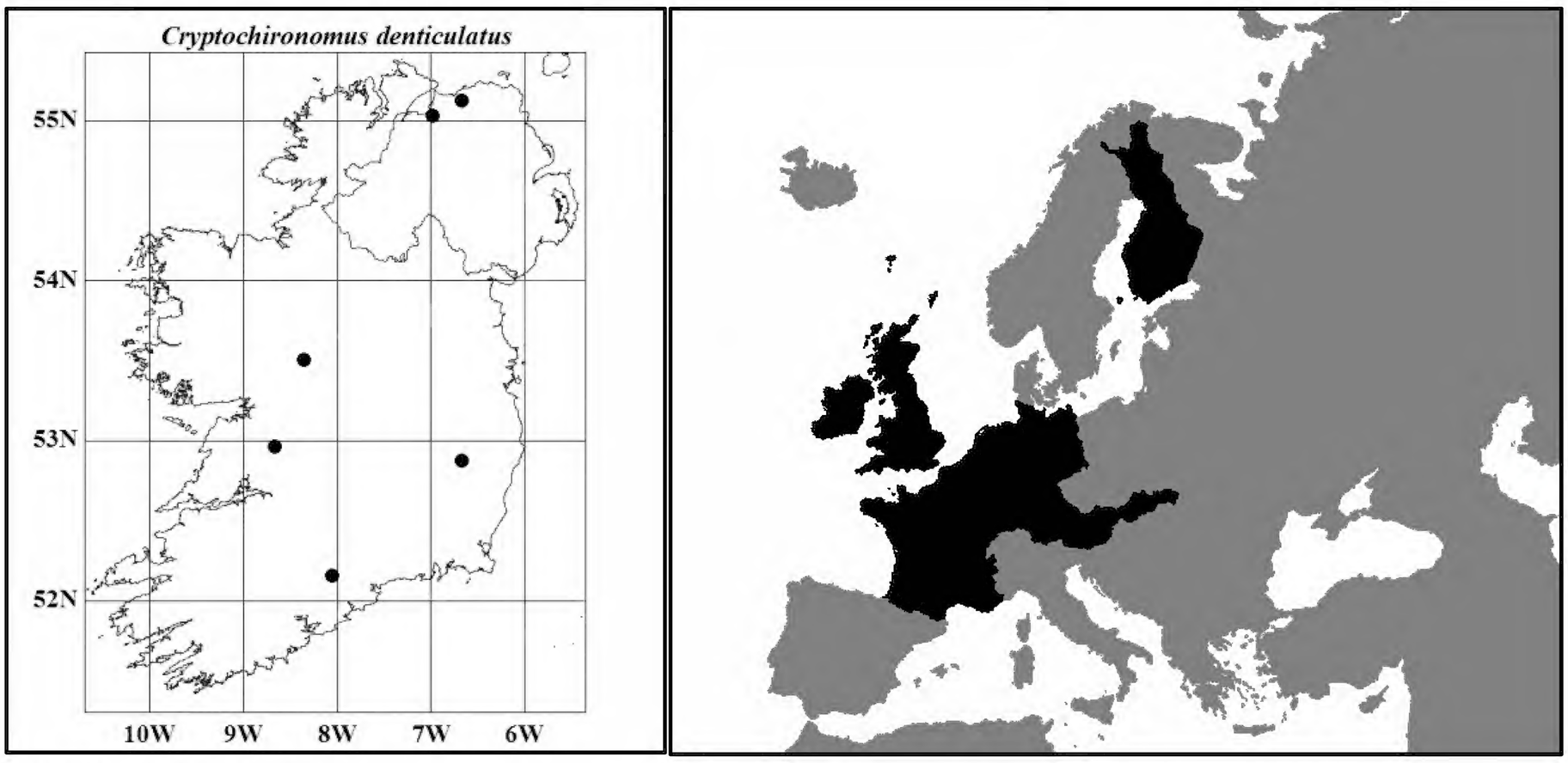
FIGURES 655-656. *Cladopelma viridulum* (Linnaeus, 1767).



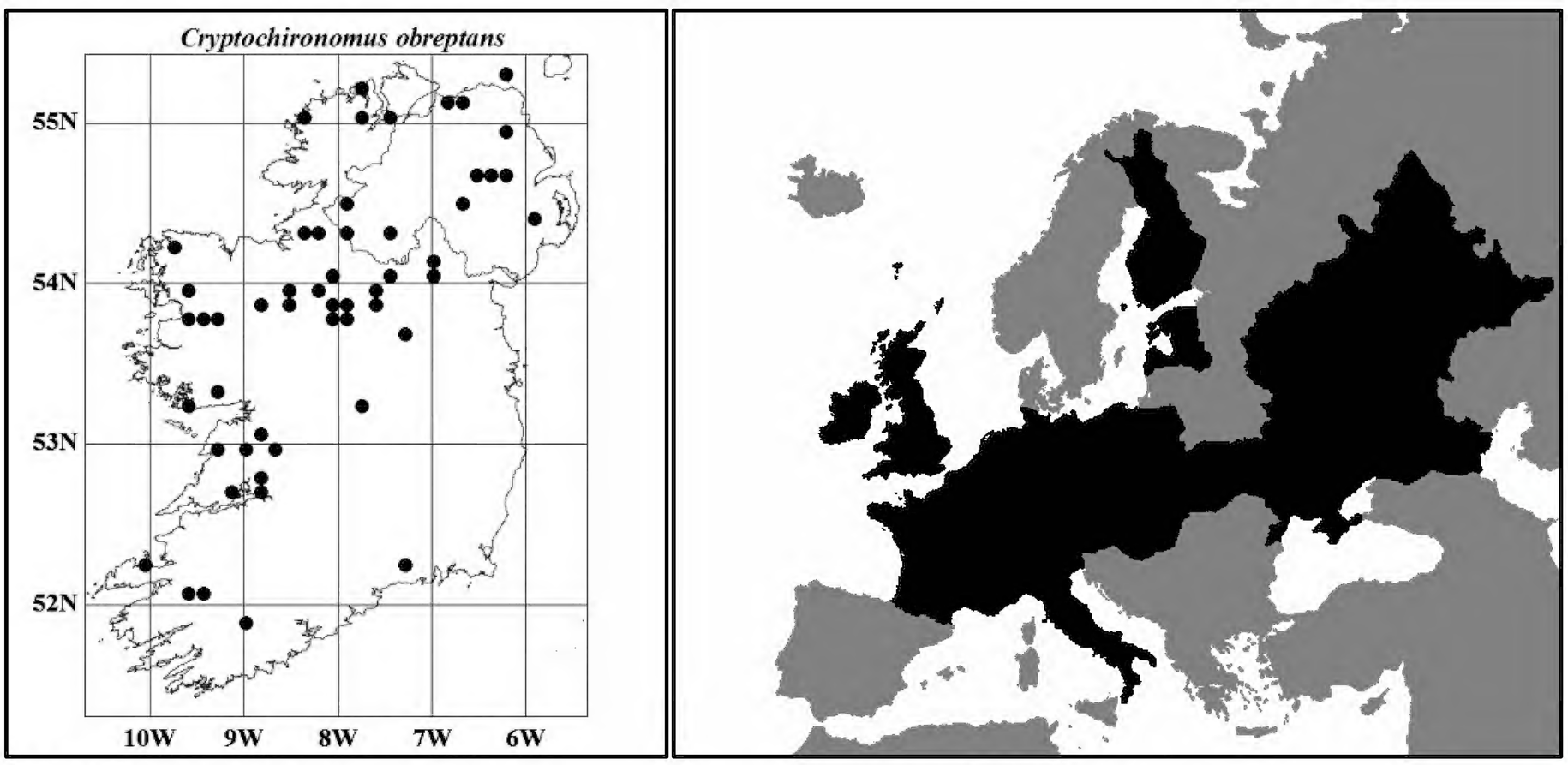
FIGURES 657-658. *Cryptochironomus albofasciatus* (Staeger, 1839).



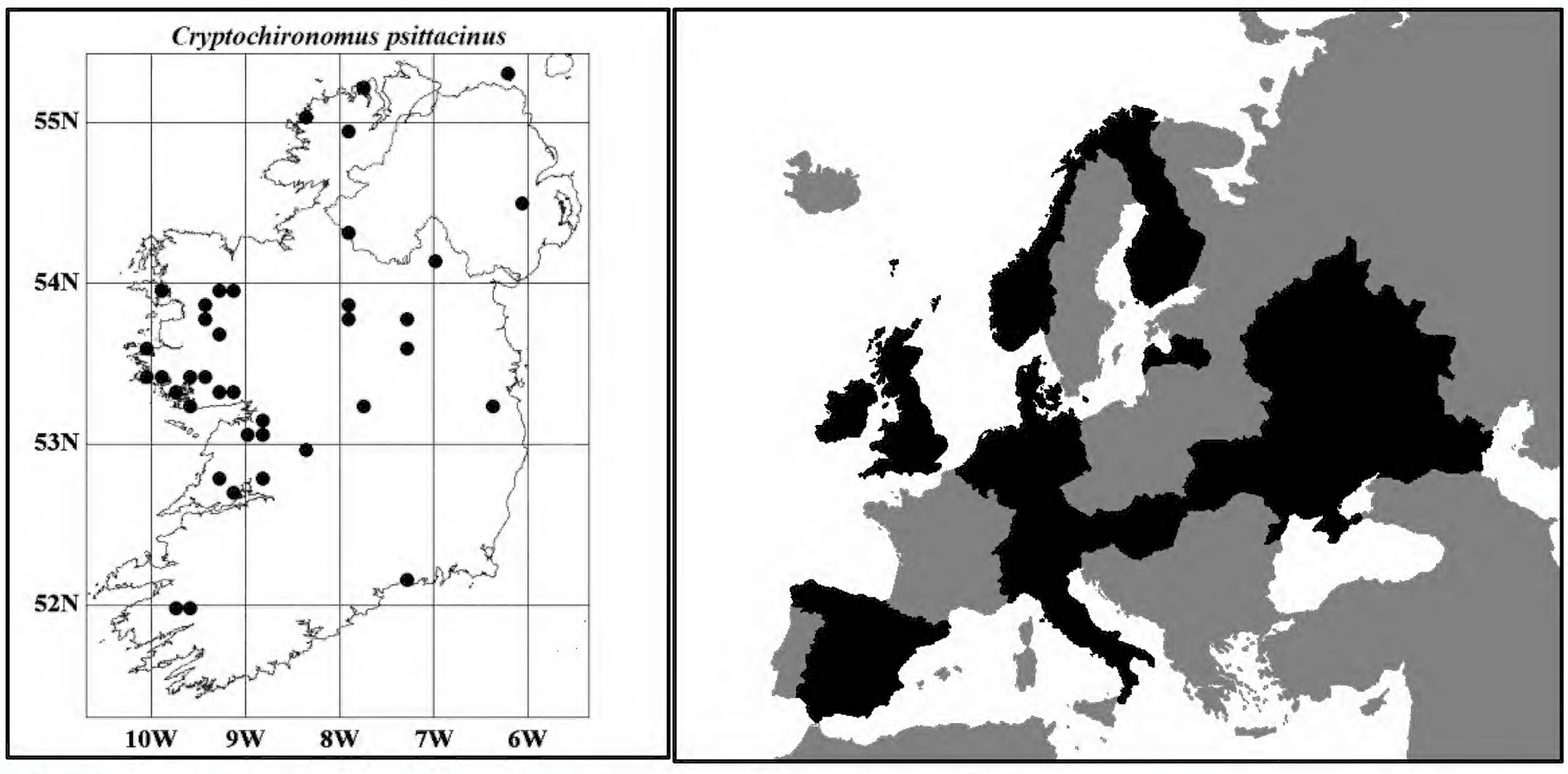
FIGURES 659-660. *Cryptochironomus defectus* (Kieffer, 1913).



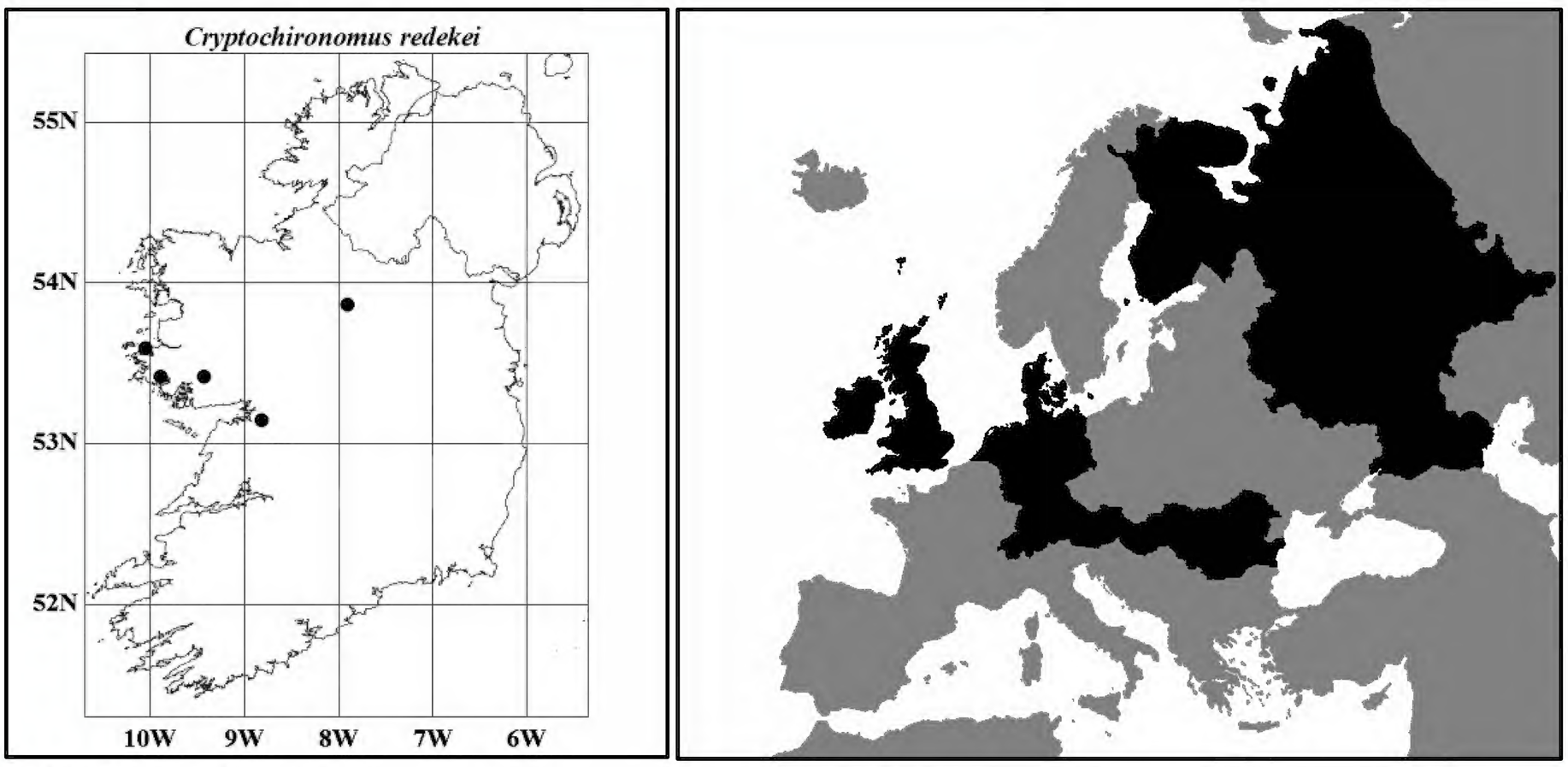
FIGURES 661-662. *Cryptochironomus denticulatus* (Goetghebuer, 1921).



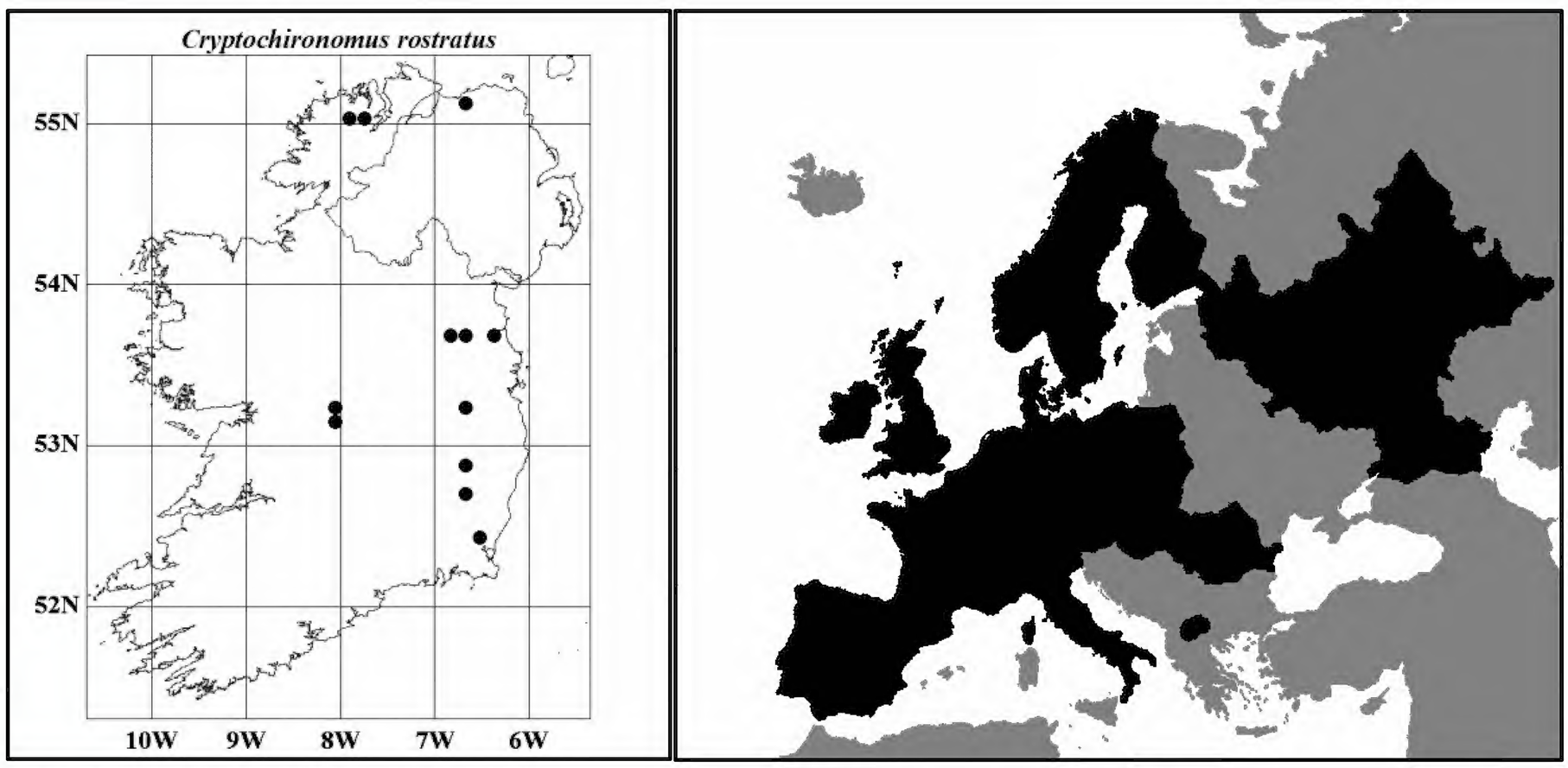
FIGURES 663-664. *Cryptochironomus obreptans* (Walker, 1856).



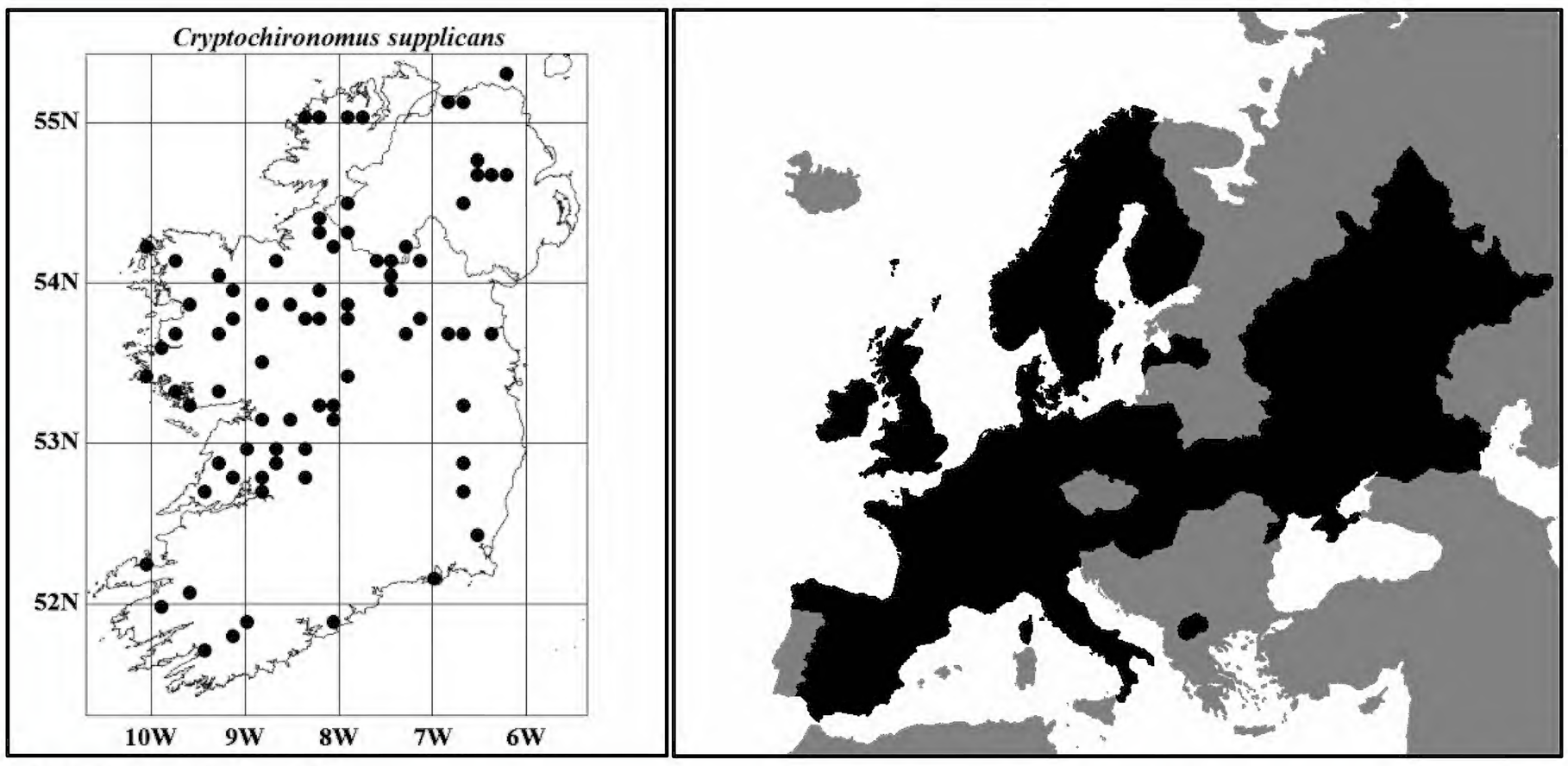
FIGURES 665-666. *Cryptochironomus psittacinus* (Meigen, 1830).



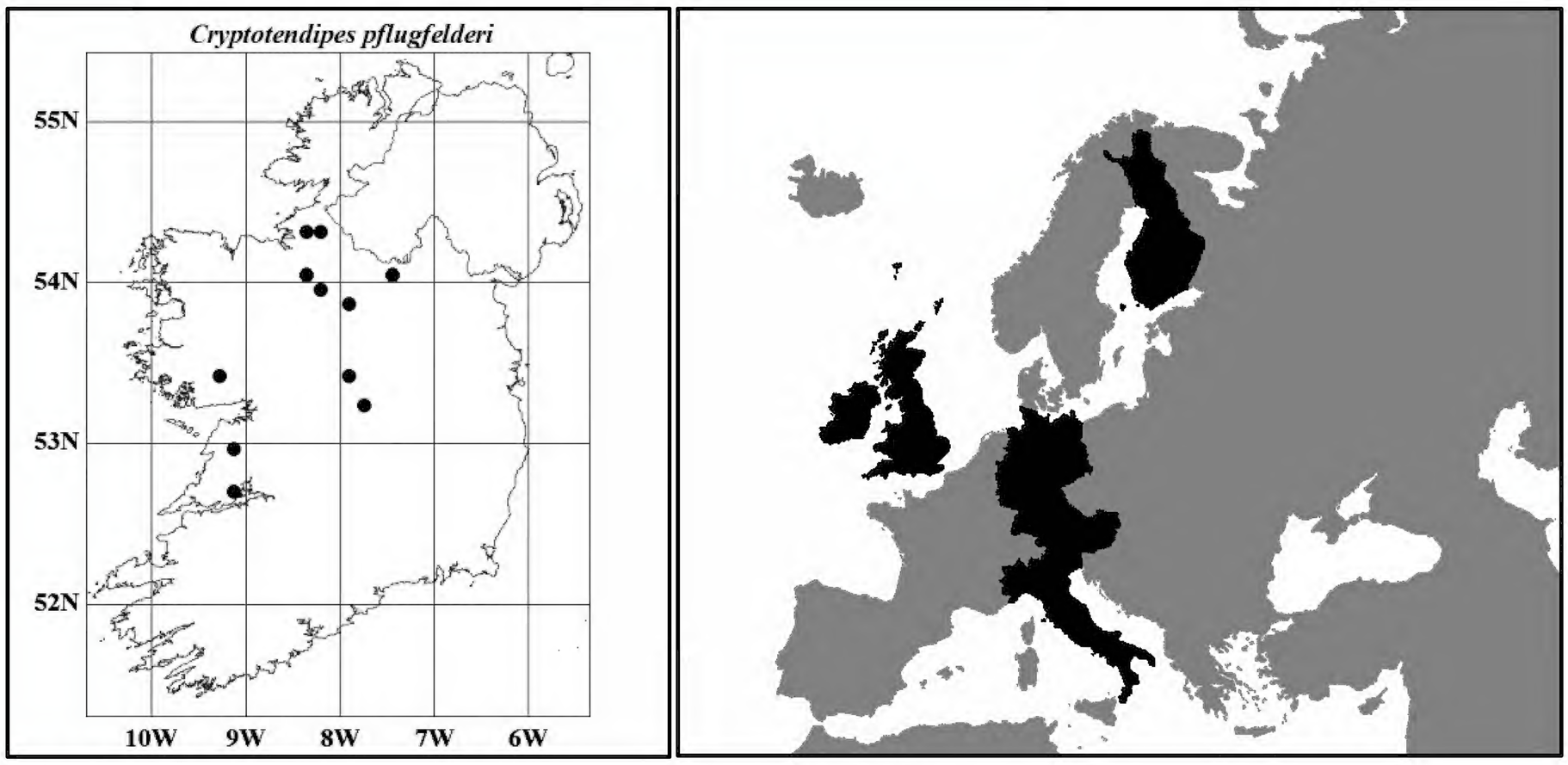
FIGURES 667-668. *Cryptochironomus redekei* (Kruseman, 1933).



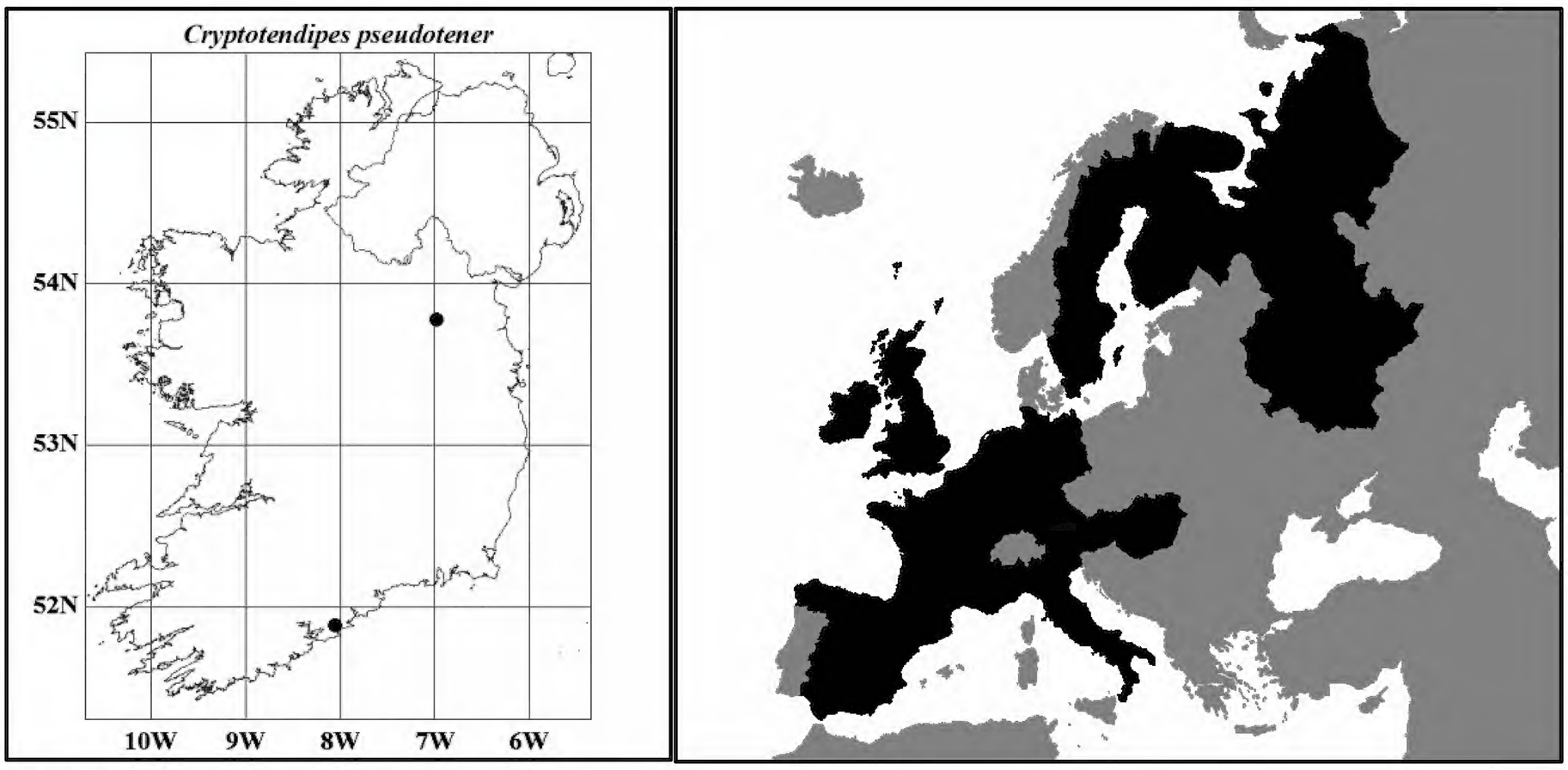
FIGURES 669-670. *Cryptochironomus rostratus* Kieffer, 1921.



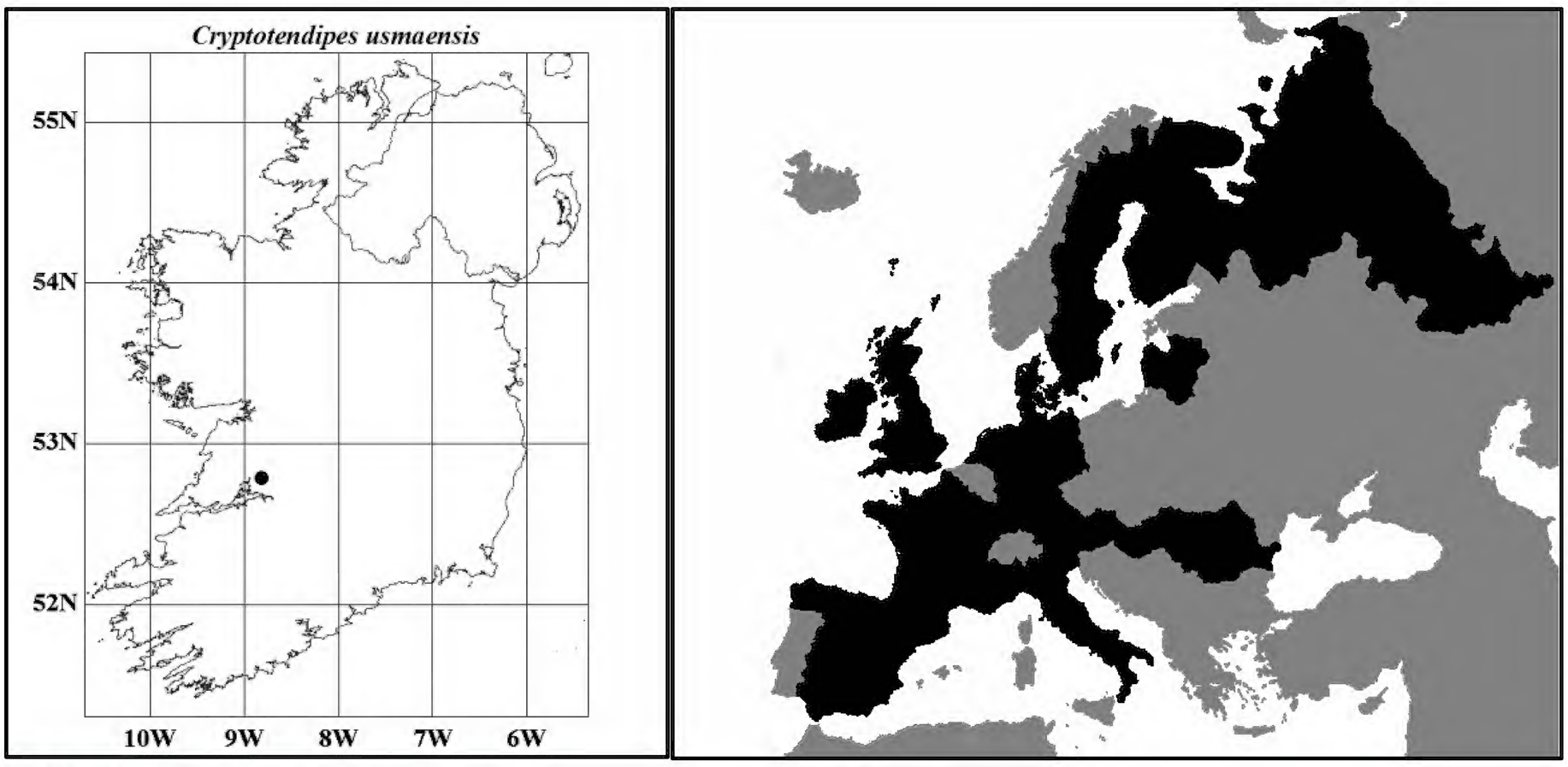
FIGURES 671-672. *Cryptochironomus supplicans* (Meigen, 1830).



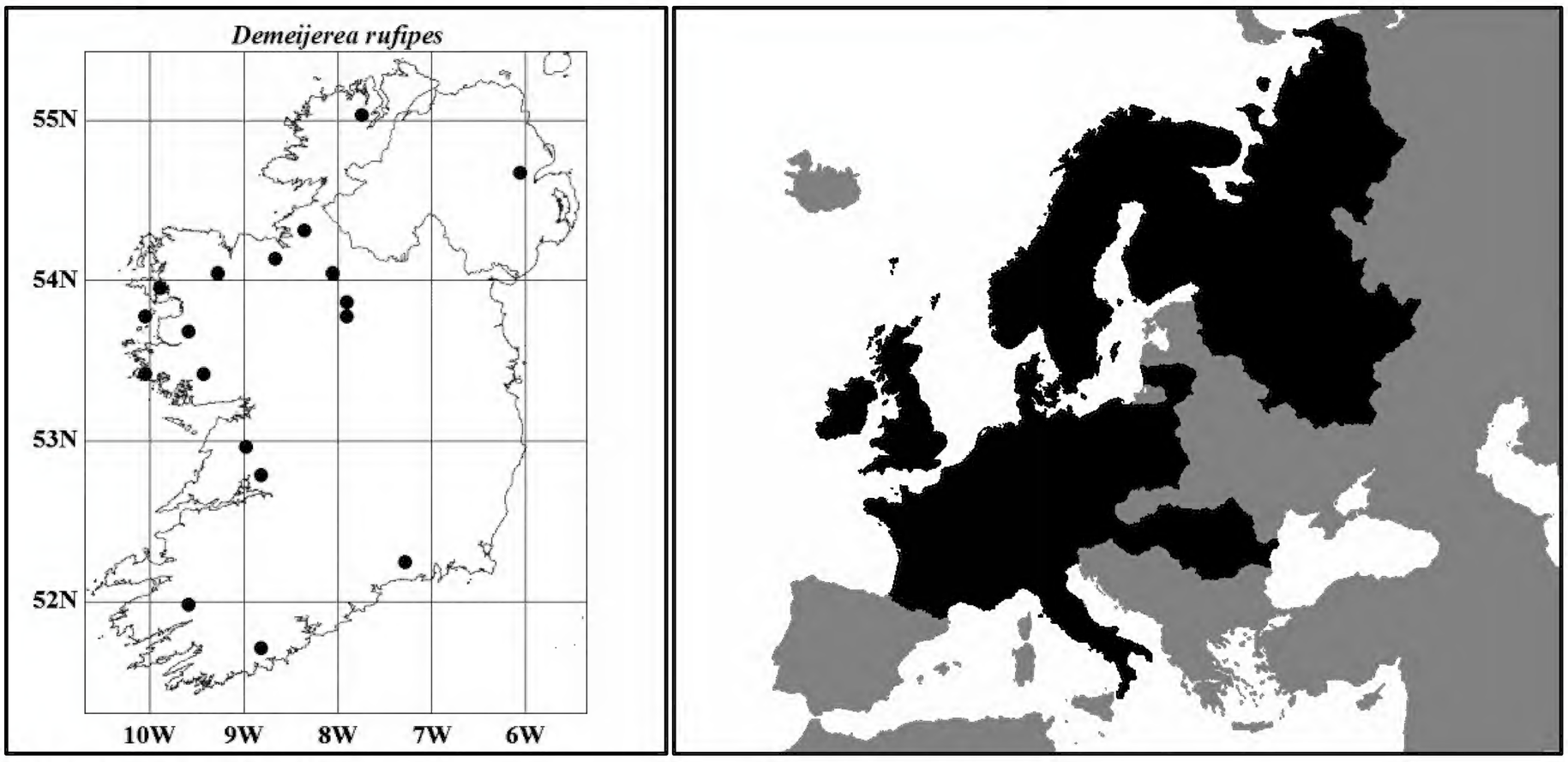
FIGURES 673-674. *Cryptotendipes pflugfelderi* Reiss, 1964.



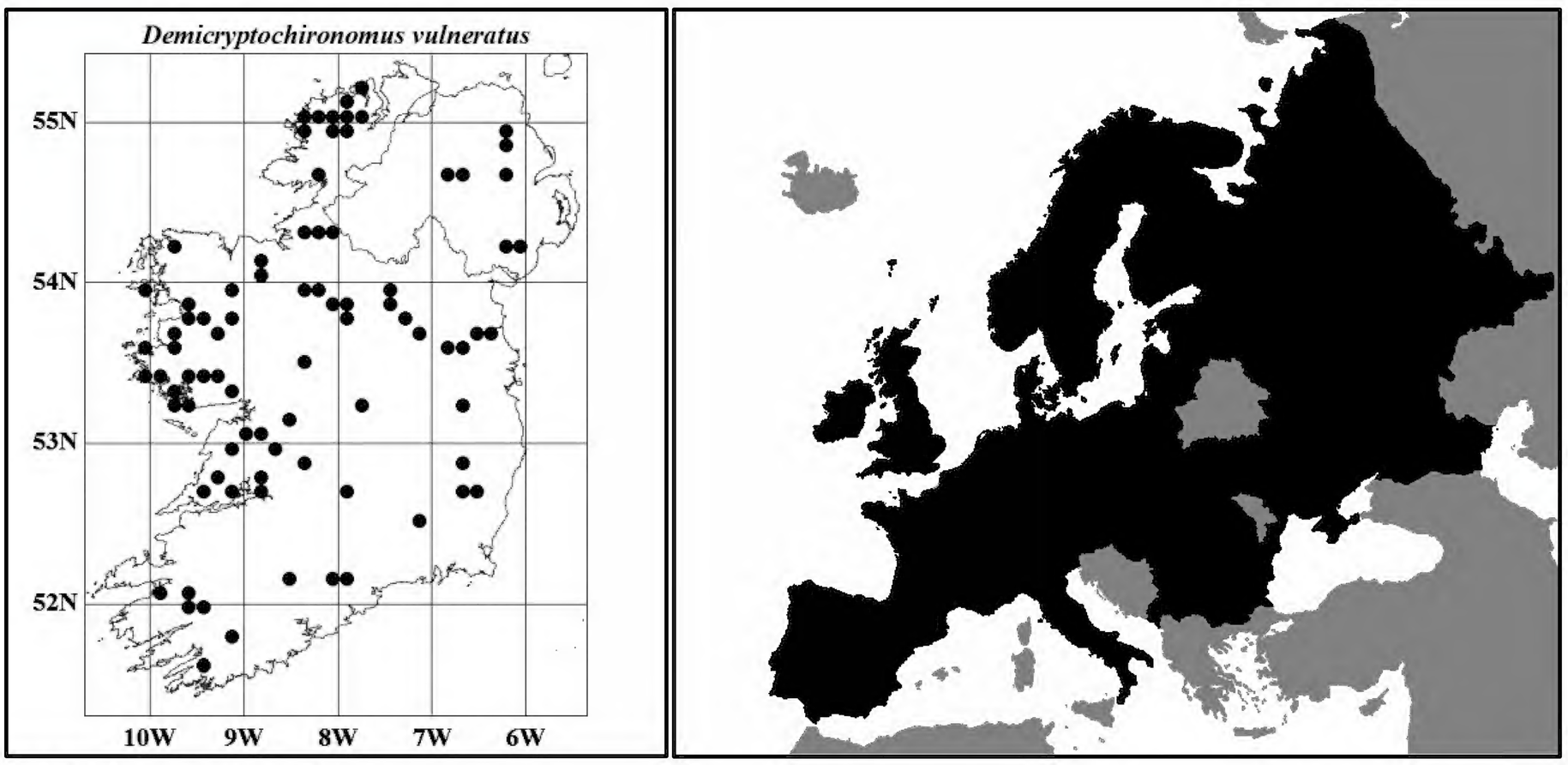
FIGURES 675-676. *Cryptotendipes pseudotener* (Goetghebuer, 1922).



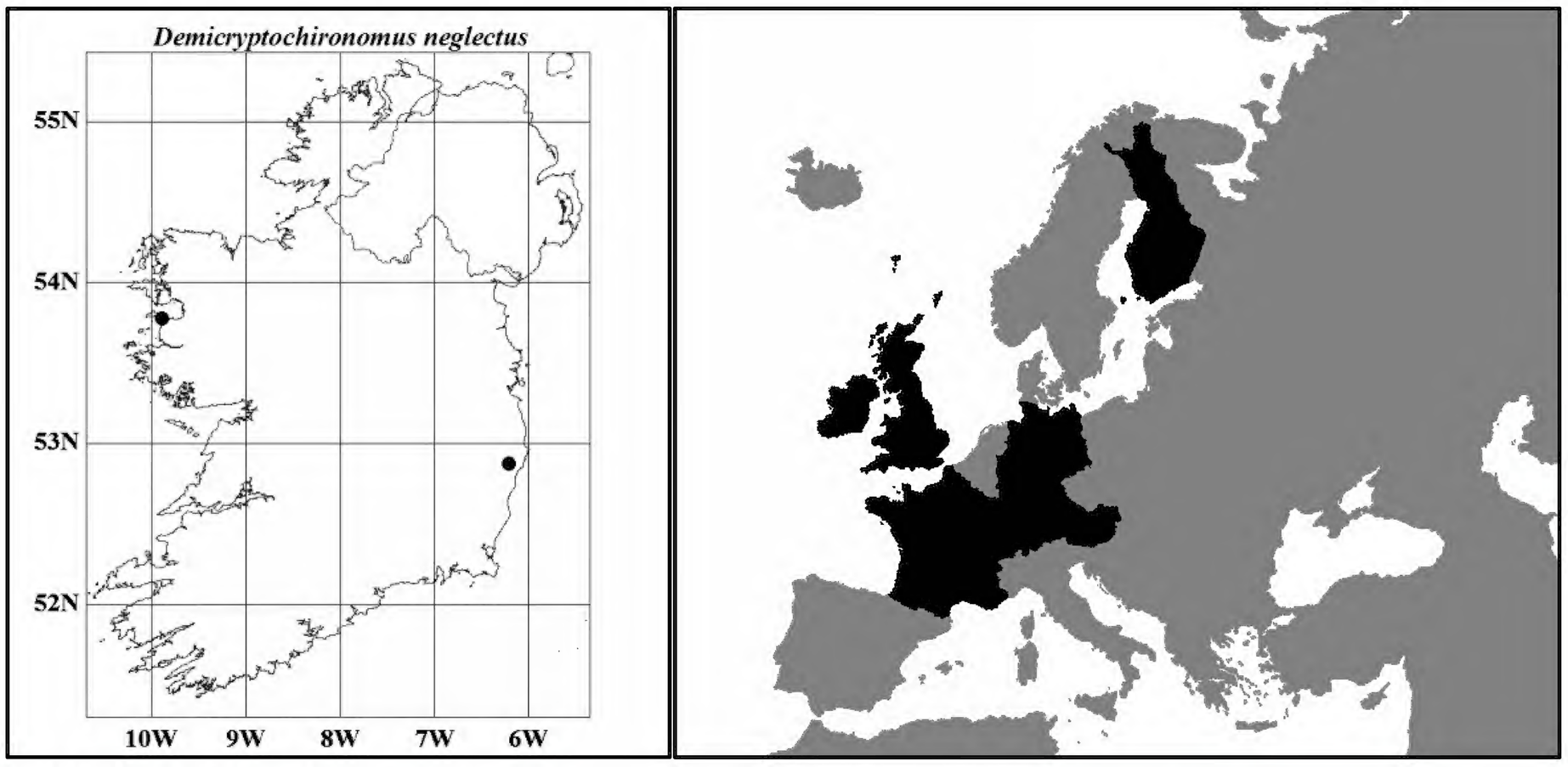
FIGURES 677-678. *Cryptotendipes usmaensis* (Pagast, 1931).



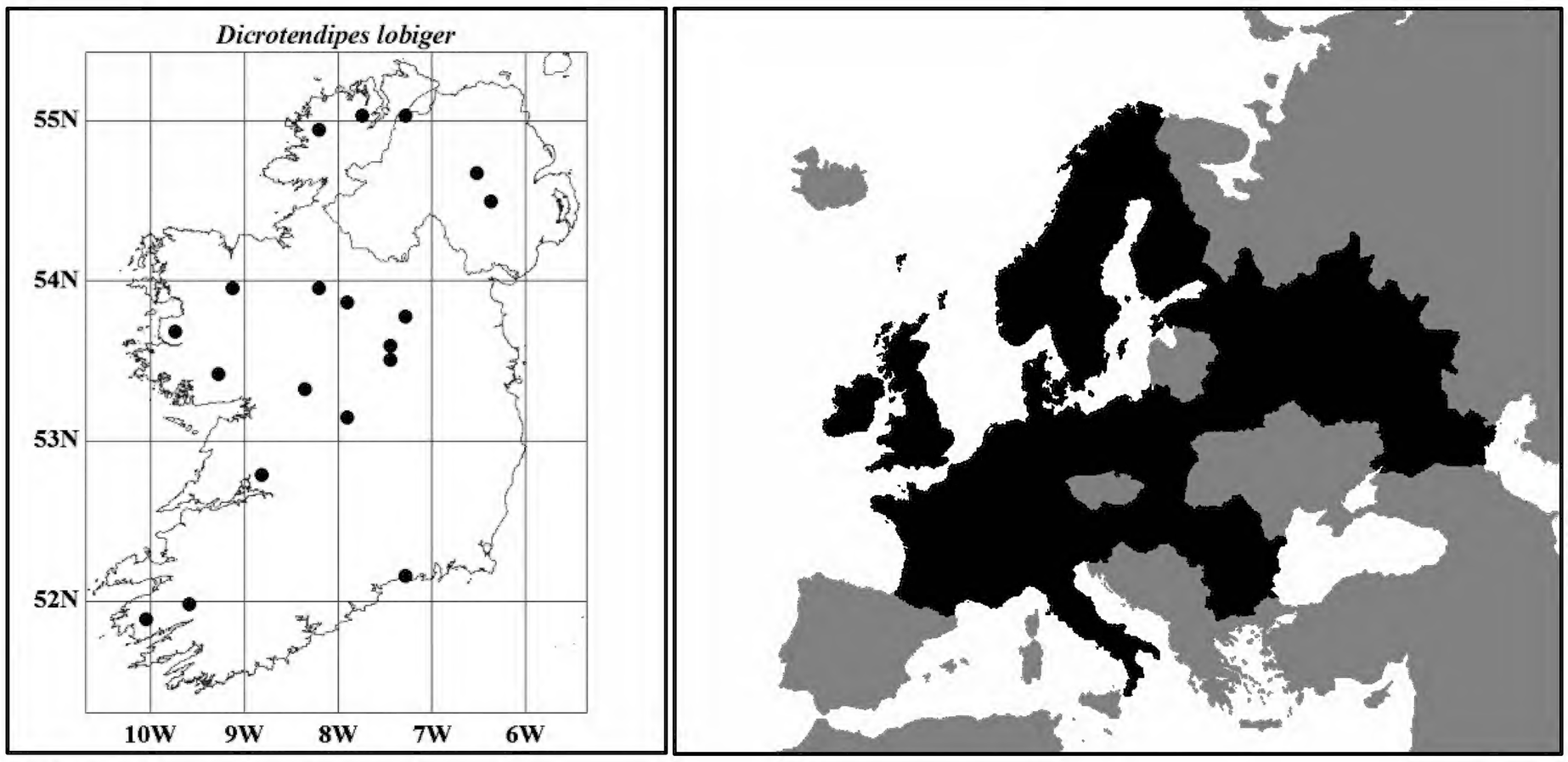
FIGURES 679-680. *Demeijerea rufipes* (Linnaeus, 1761).



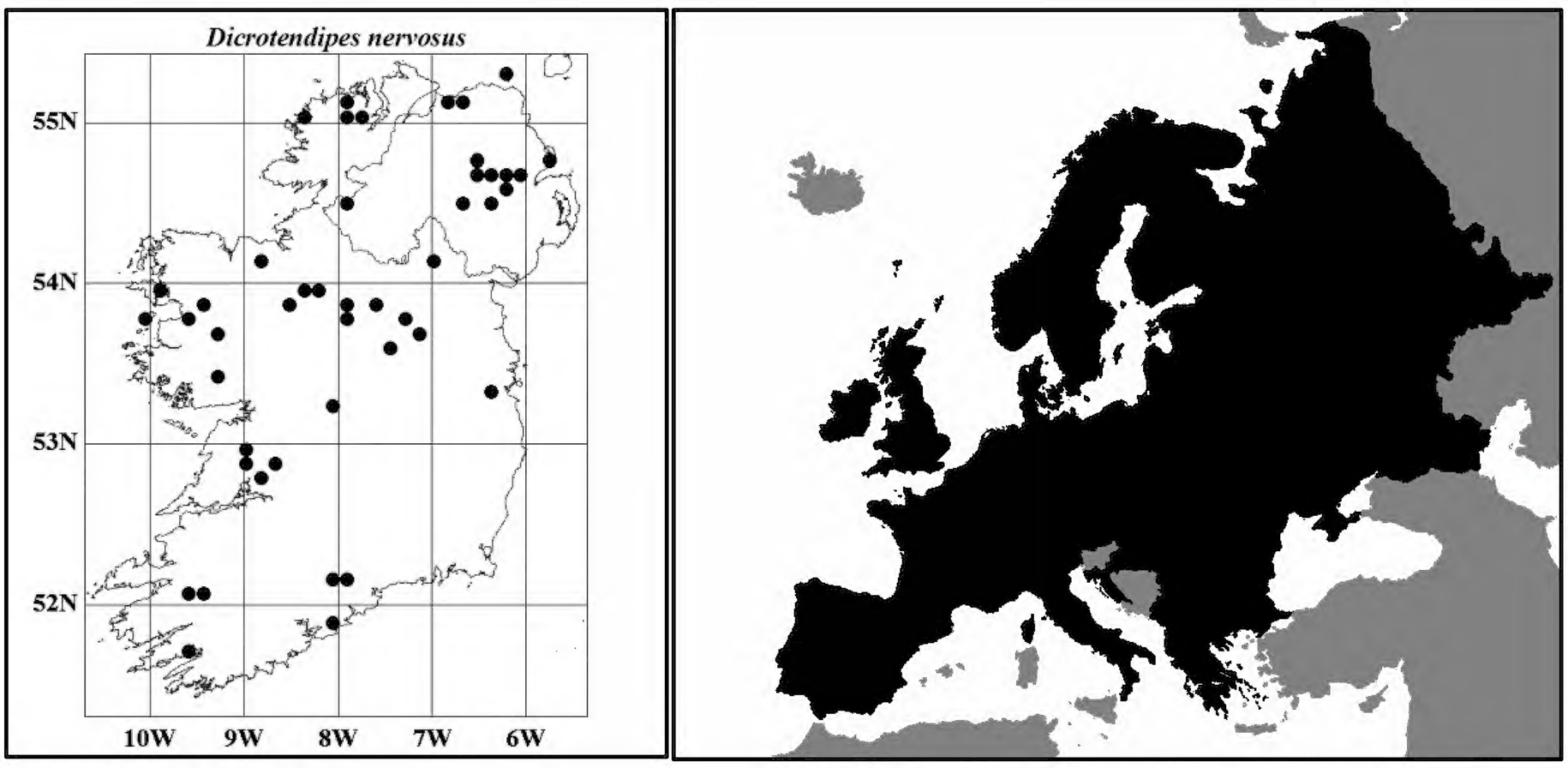
FIGURES 681-682. *Demicryptochironomus vulneratus* (Zetterstedt, 1838).



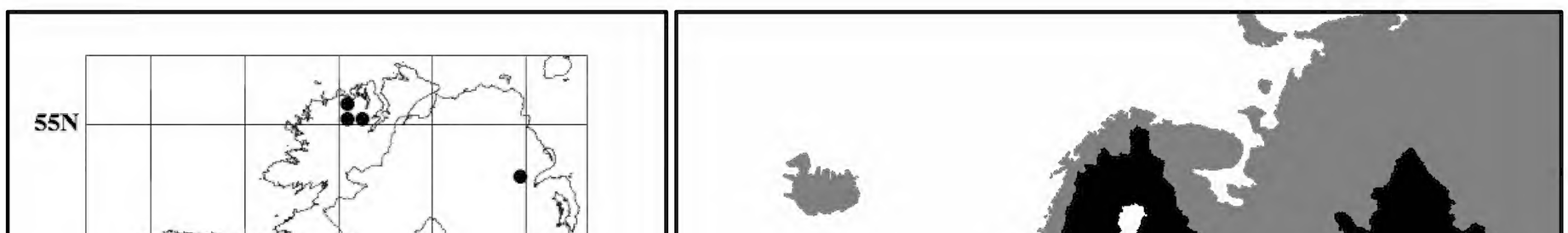
FIGURES 683-684. *Demicryptochironomus neglectus* Reiss, 1988.



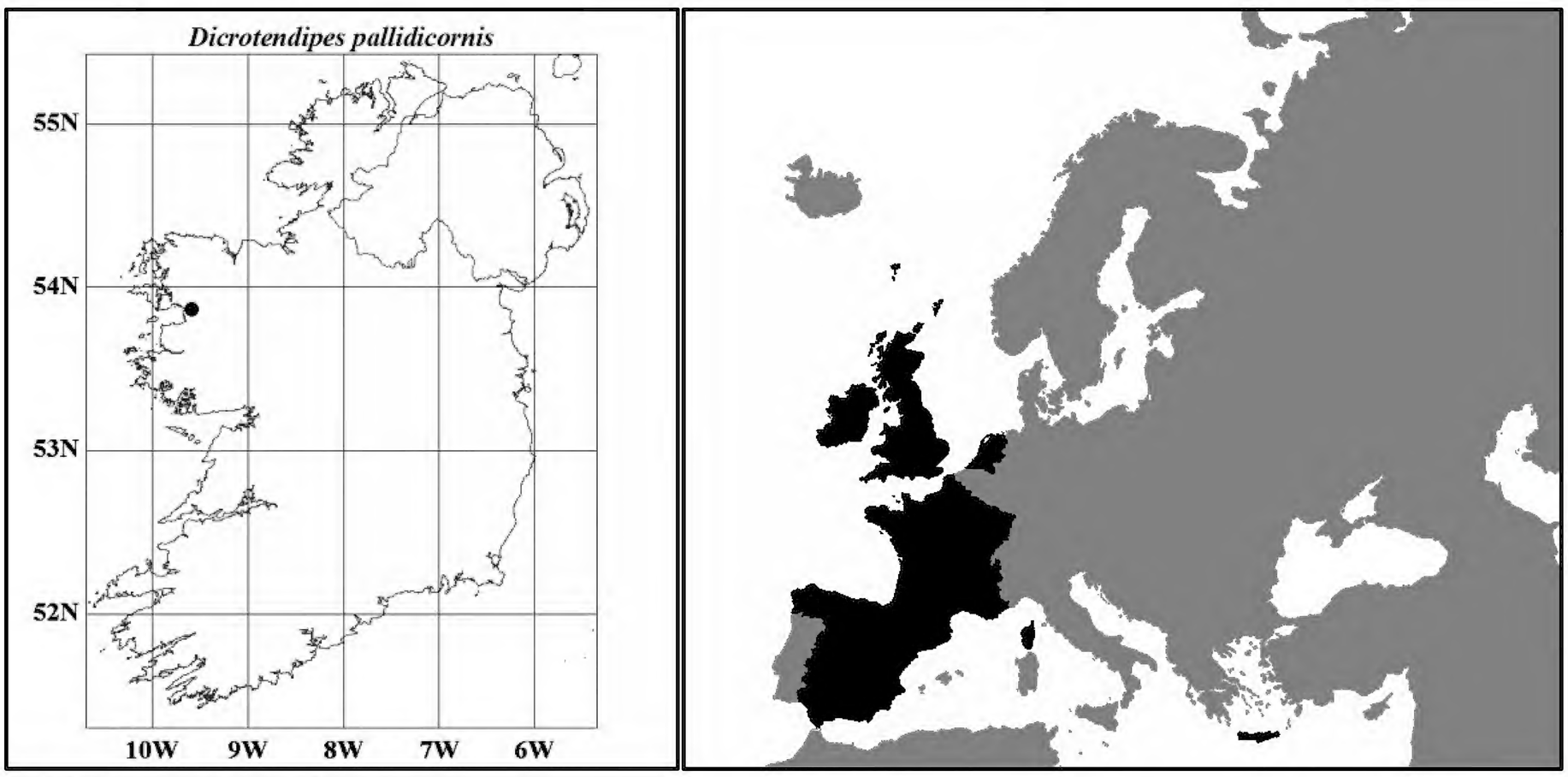
FIGURES 685-686. *Dicrotendipes lobiger* (Kieffer, 1921).



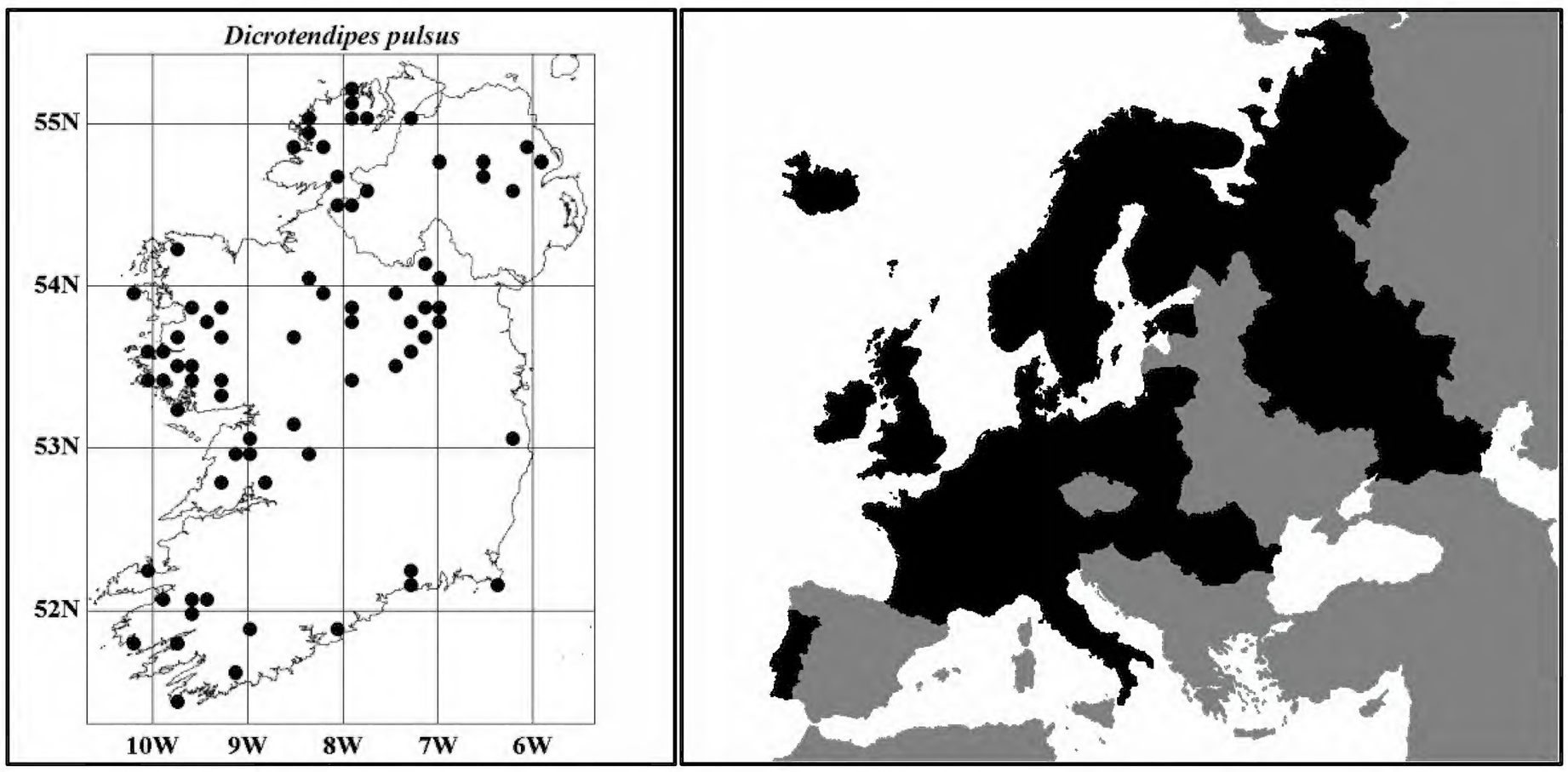
FIGURES 687-688. *Dicrotendipes nervosus* (Staeger, 1839).



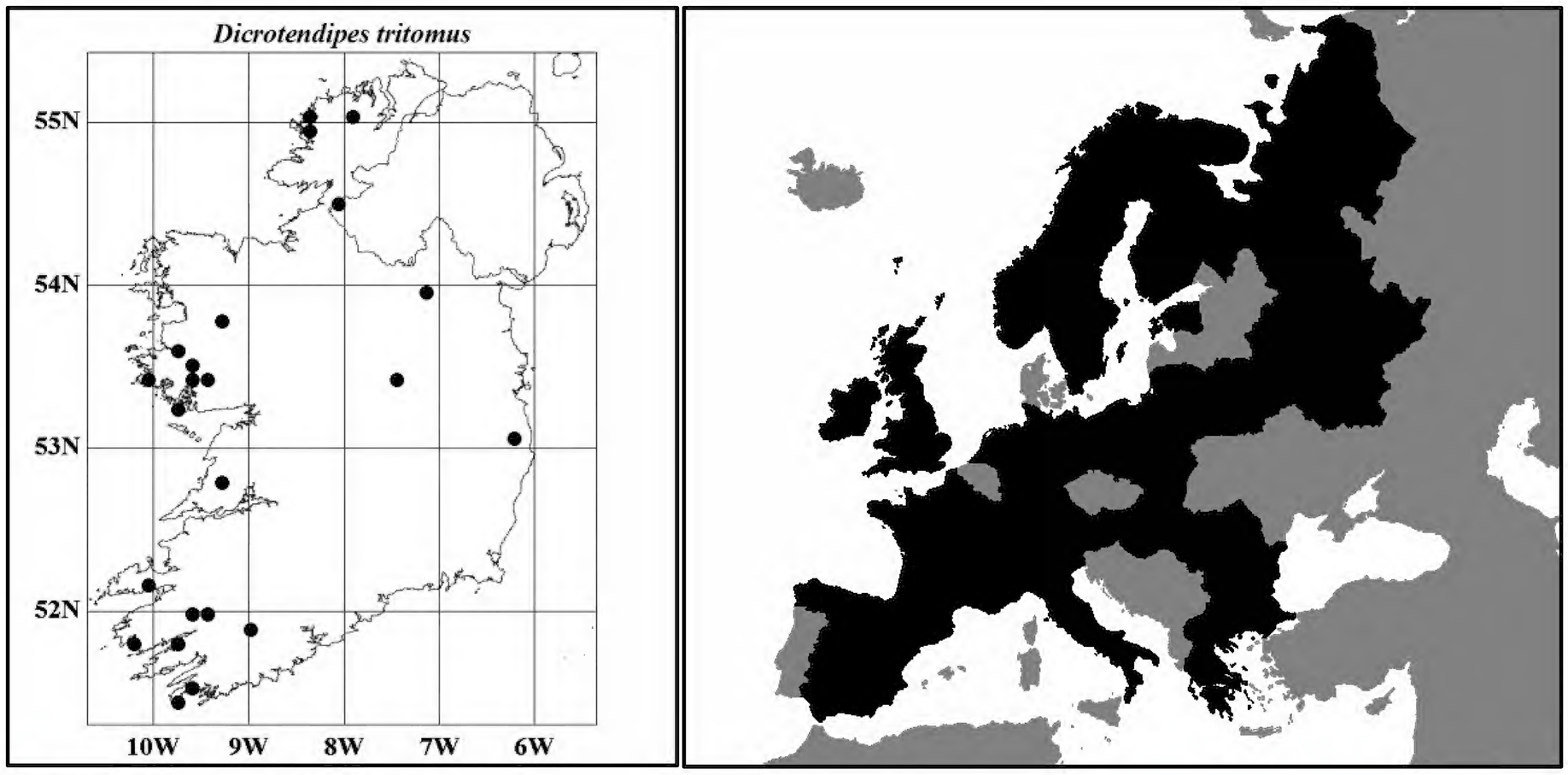
FIGURES 689-690. *Dicrotendipes notatus* (Meigen, 1818).



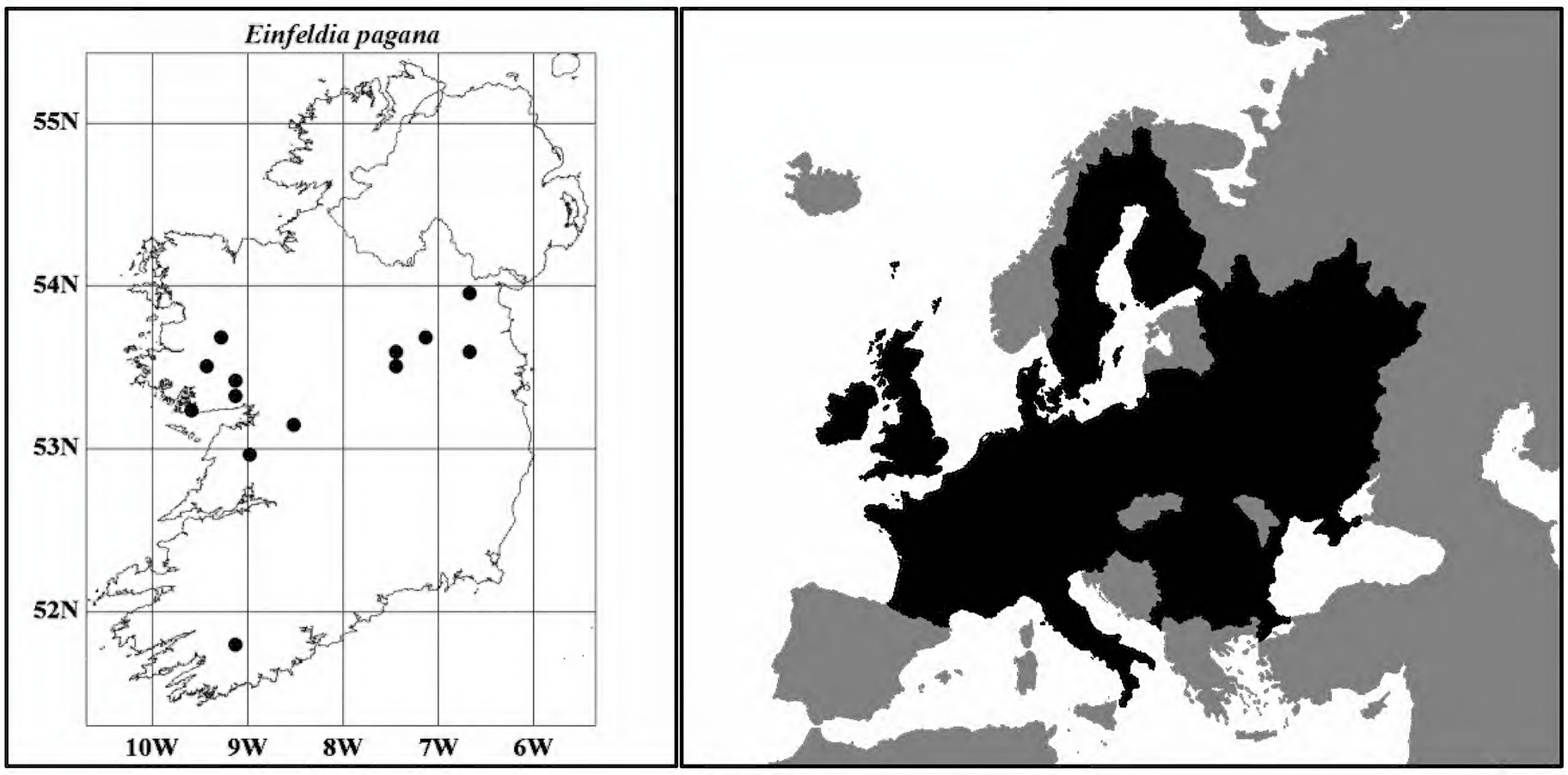
FIGURES 691-692. *Dicrotendipes pallidicornis* (Goetghebuer, 1934).



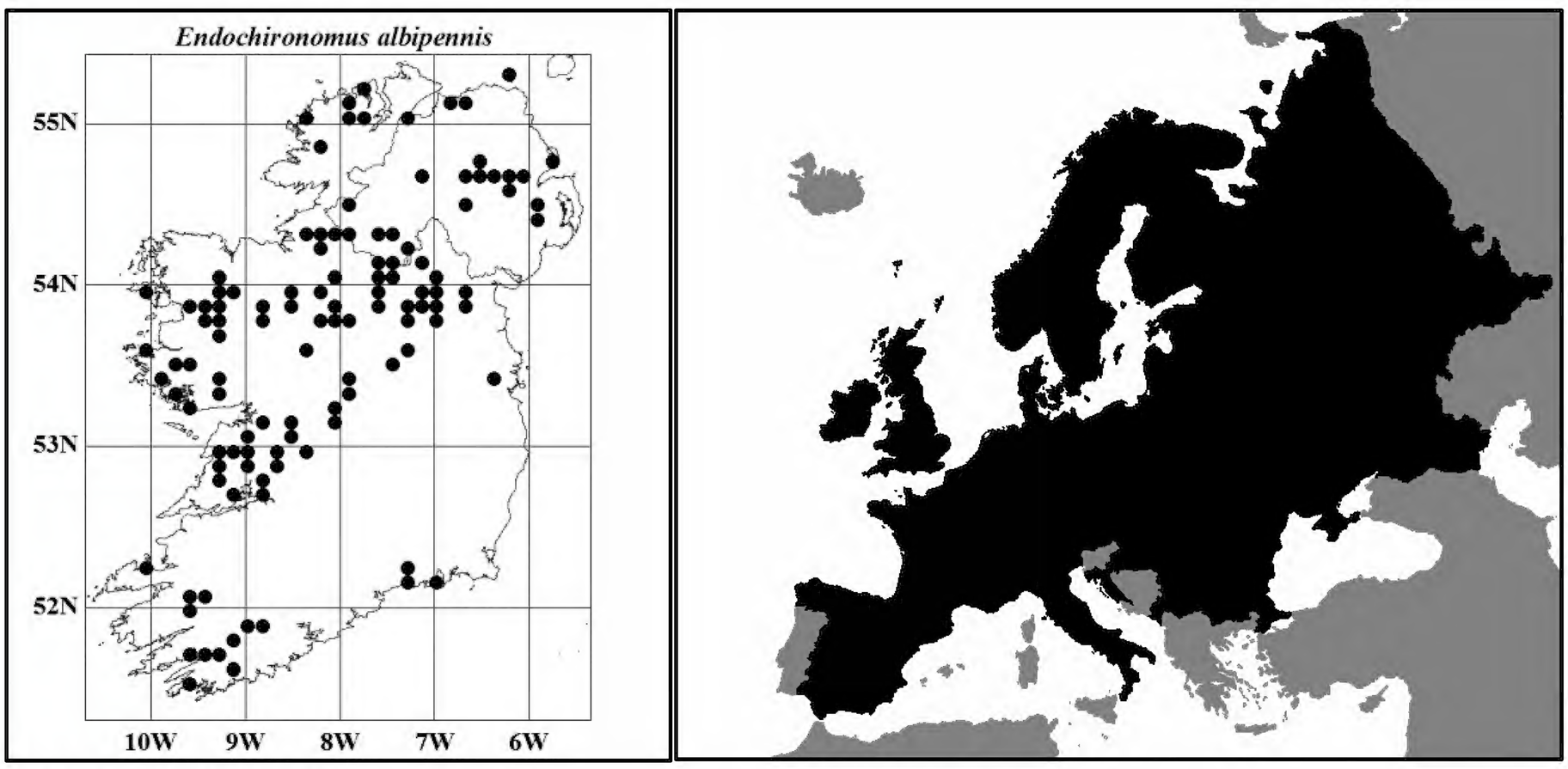
FIGURES 693-694. *Dicrotendipes pulsus* (Walker, 1856).



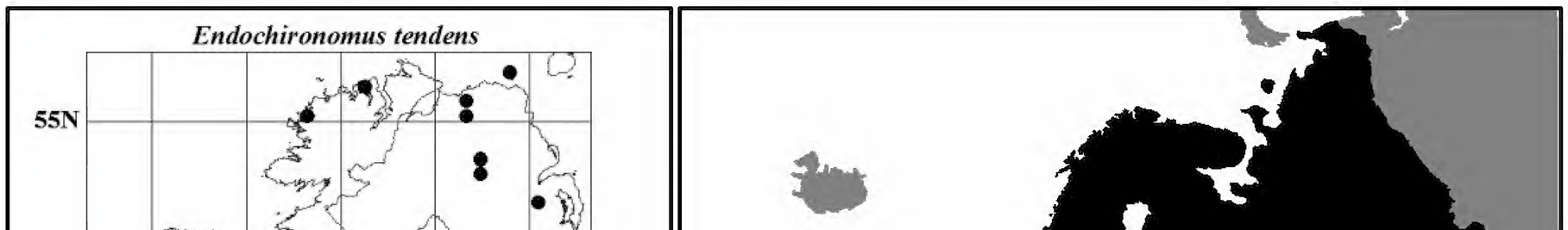
FIGURES 695-696. *Dicrotendipes tritomus* (Kieffer 1916).



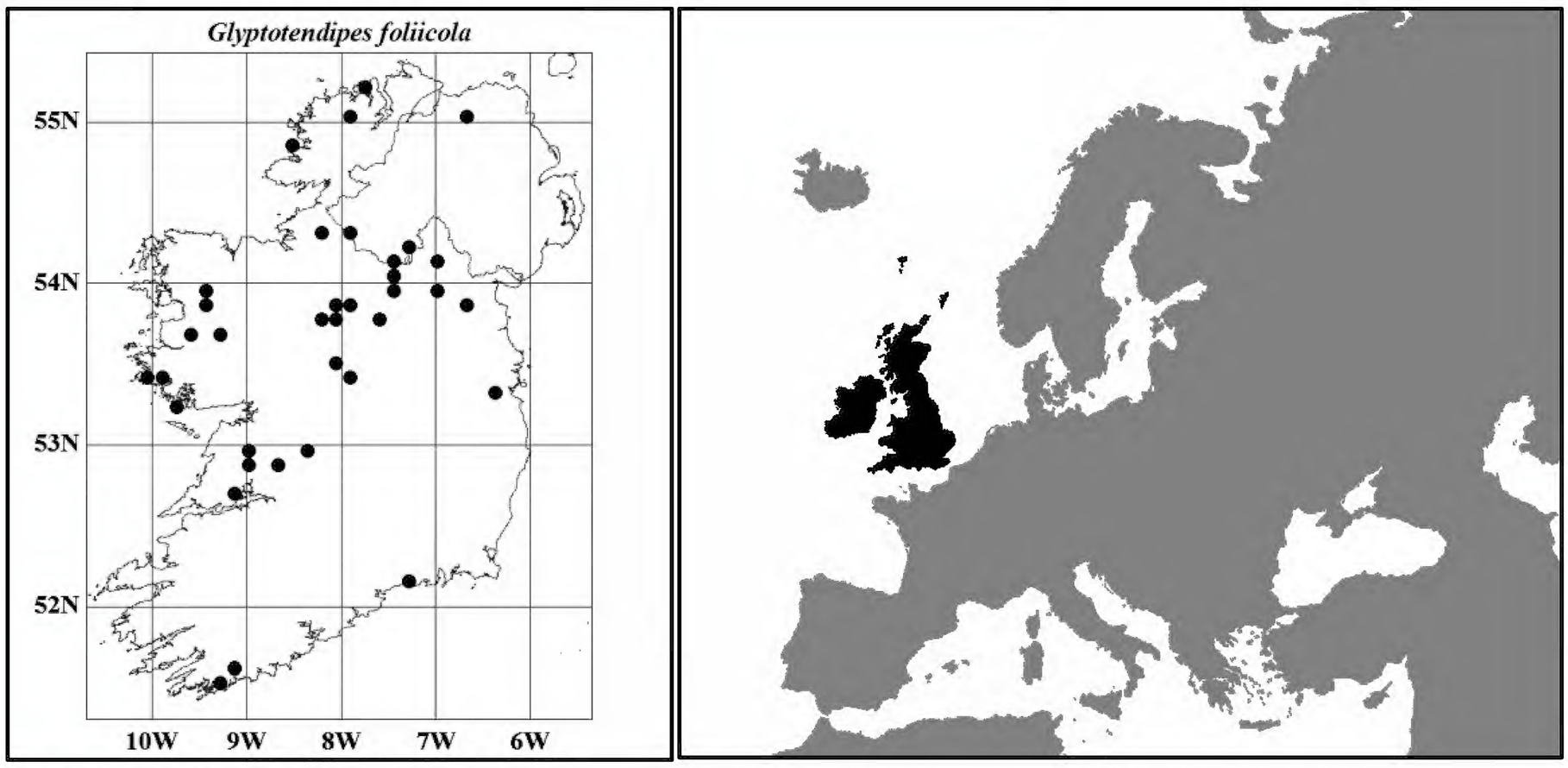
FIGURES 697-698. *Einfeldia pagana* (Meigen, 1838).



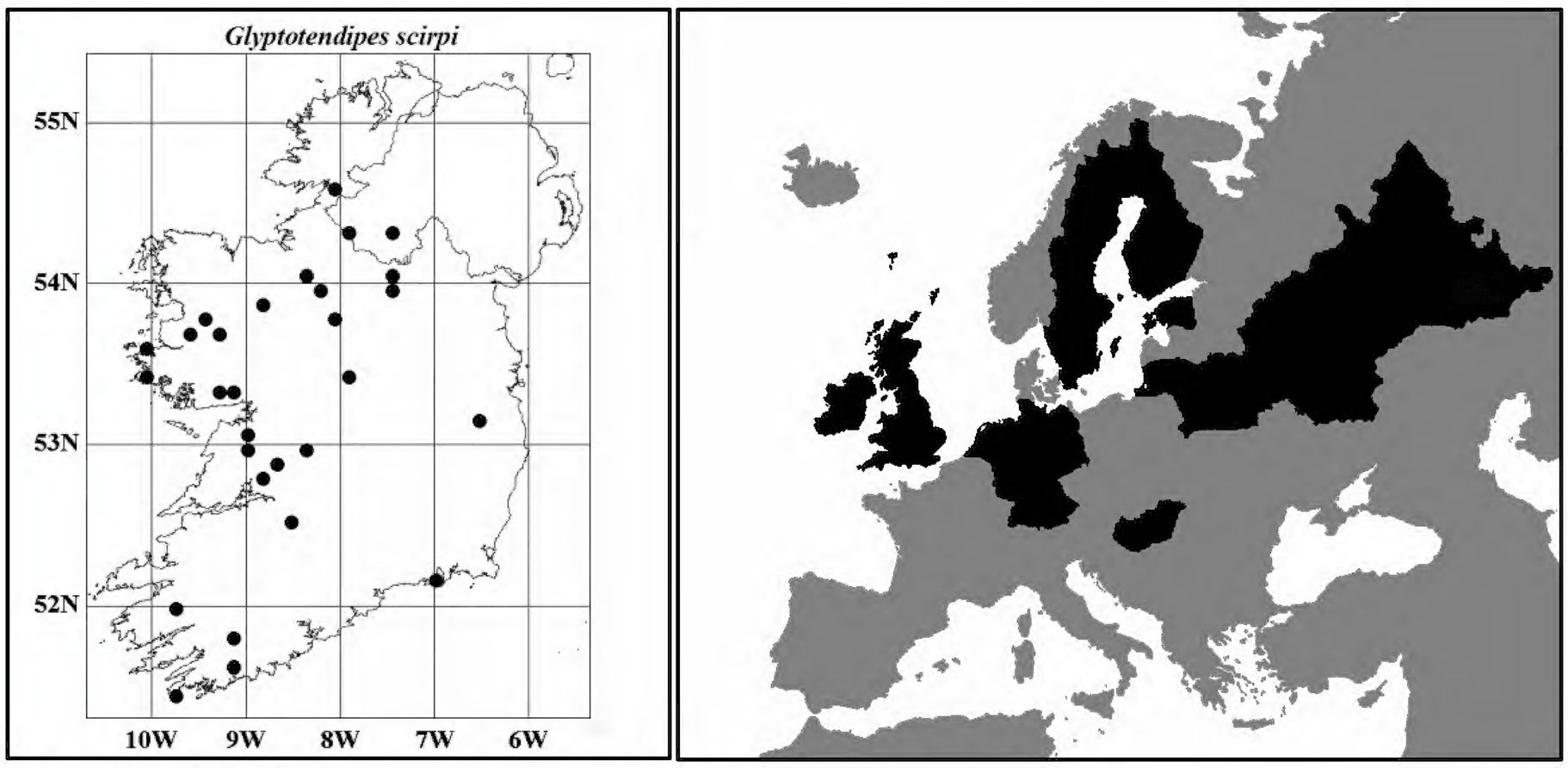
FIGURES 699-700. *Endochironomus albipennis* (Meigen, 1830).



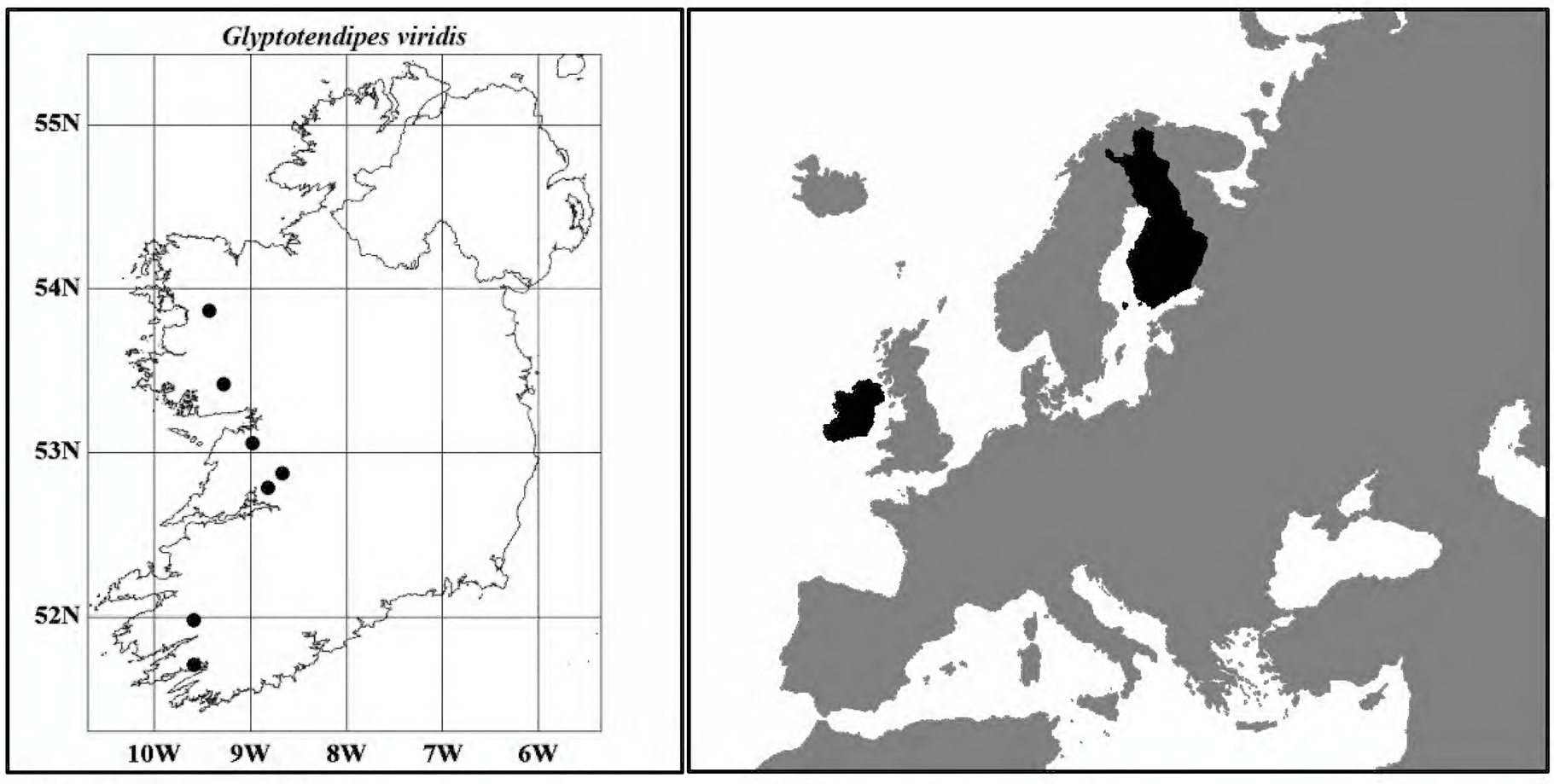
FIGURES 701-702. *Endochironomus tendens* (Fabricius, 1775).



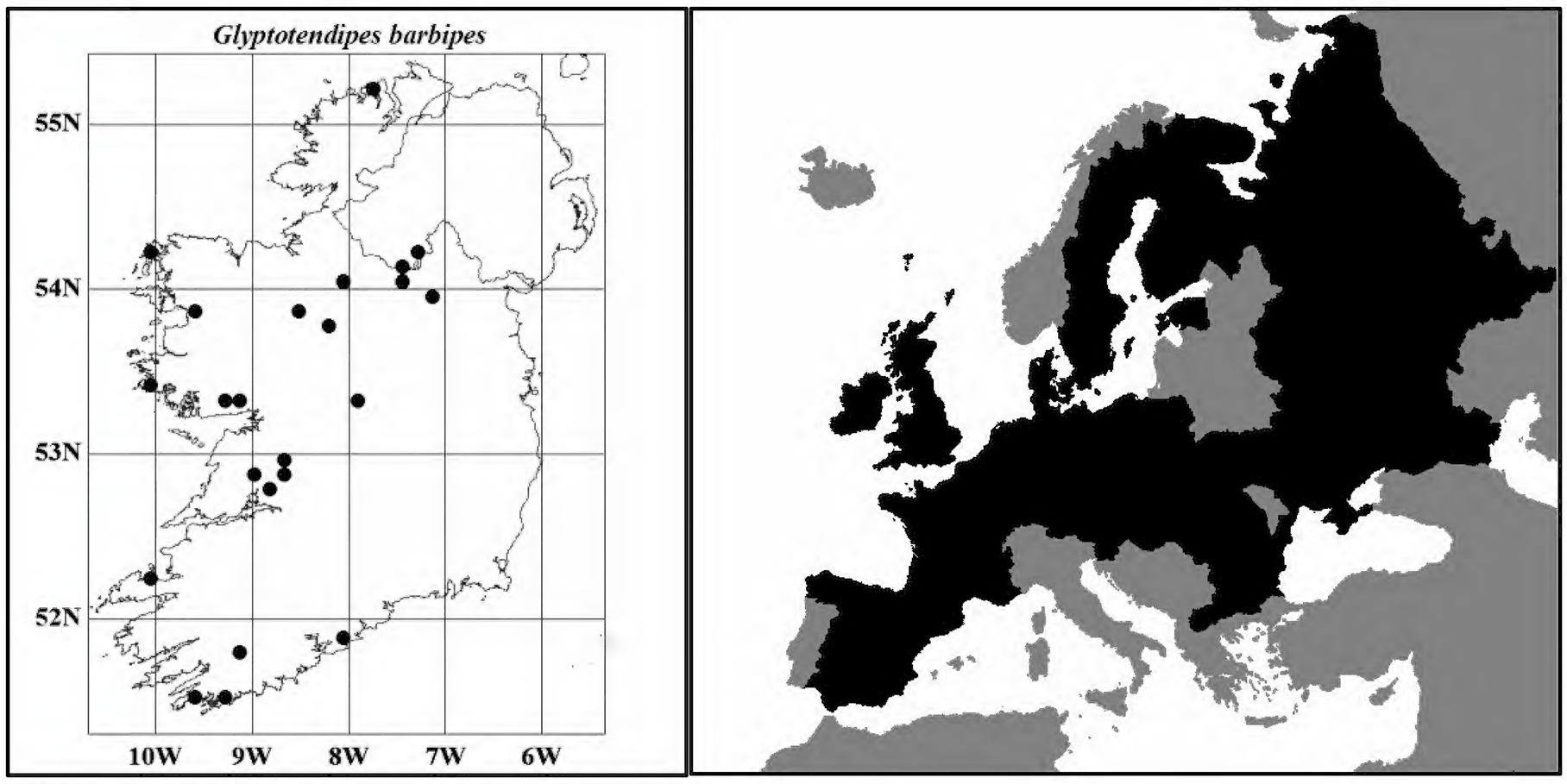
FIGURES 703-704. *Glyptotendipes foliicola* Kieffer sensu Pinder (1978).



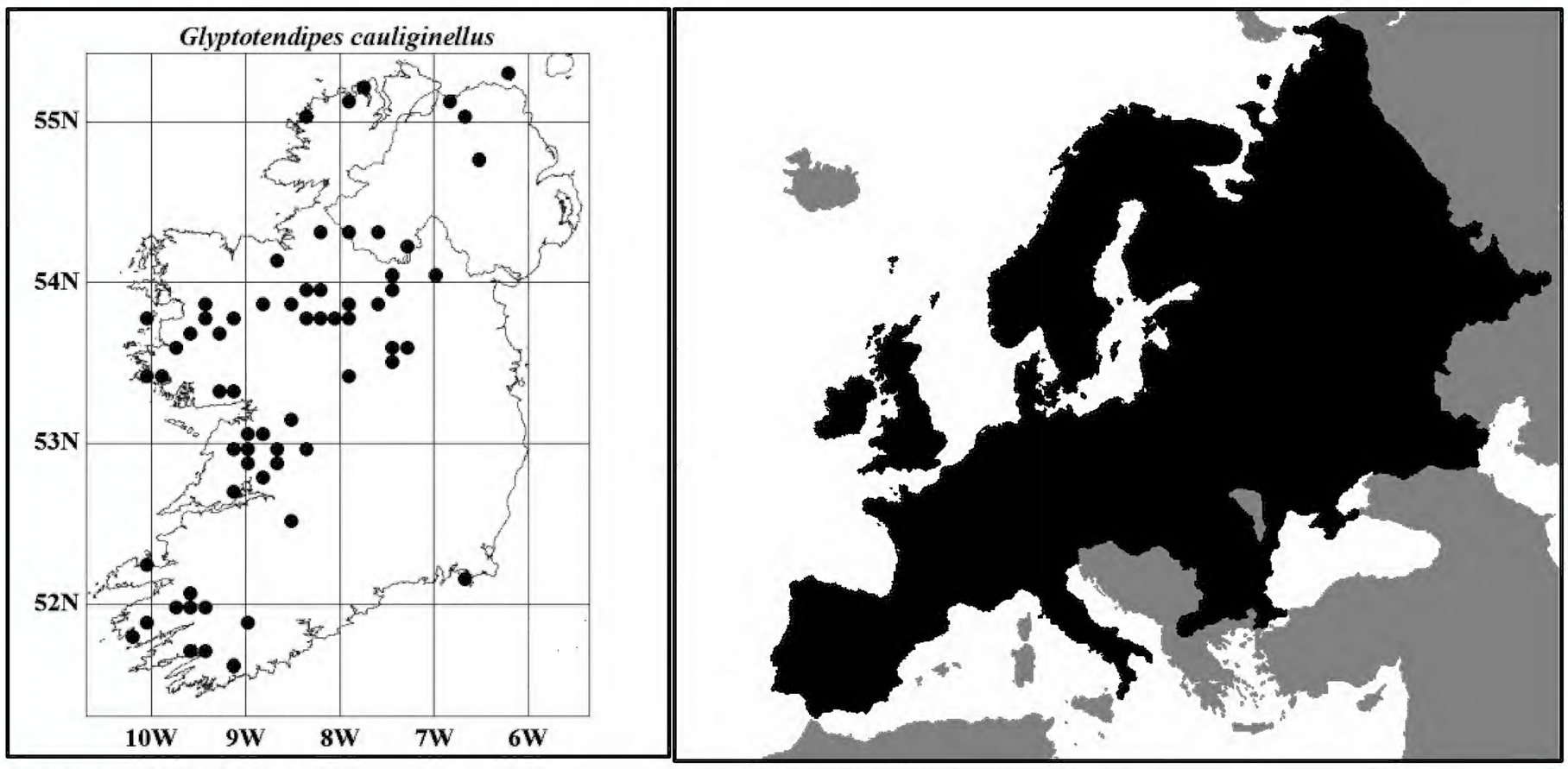
FIGURES 705-706. *Glyptotendipes scirpi* (Kieffer, 1915).



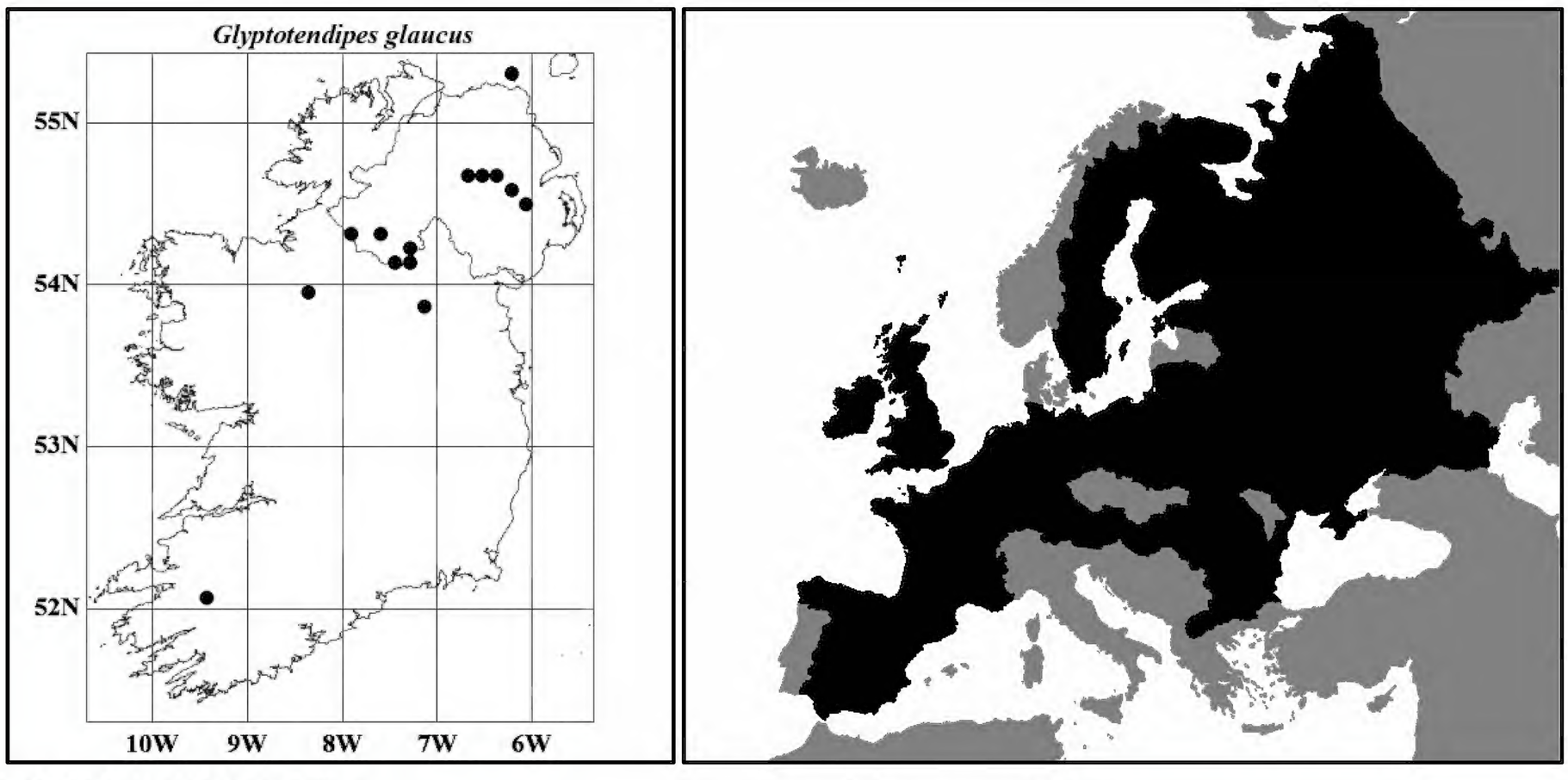
FIGURES 707-708. *Glyptotendipes viridis* (Macquart, 1834).



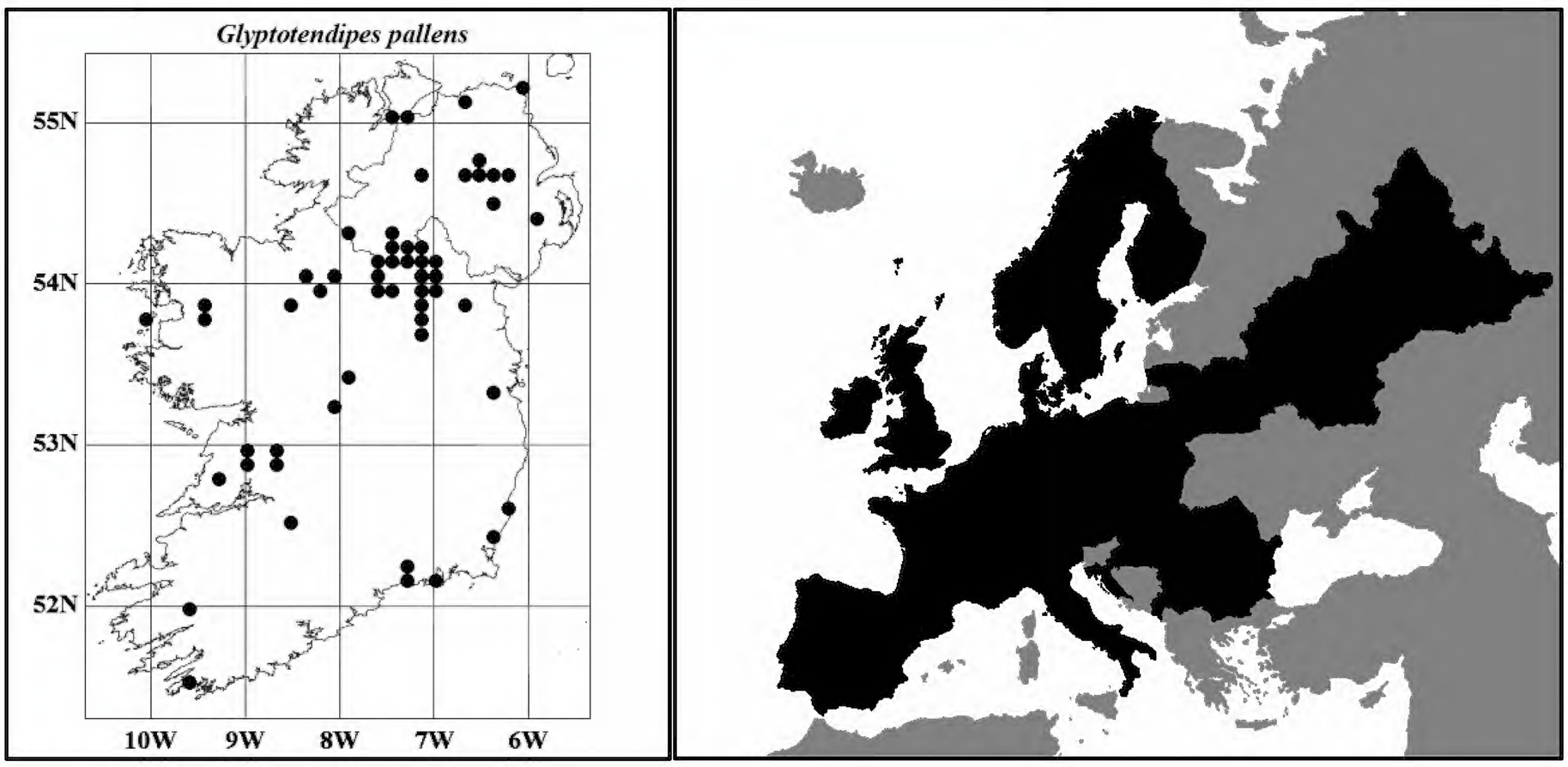
FIGURES 709-710. *Glyptotendipes barbipes* (Staeger, 1839).



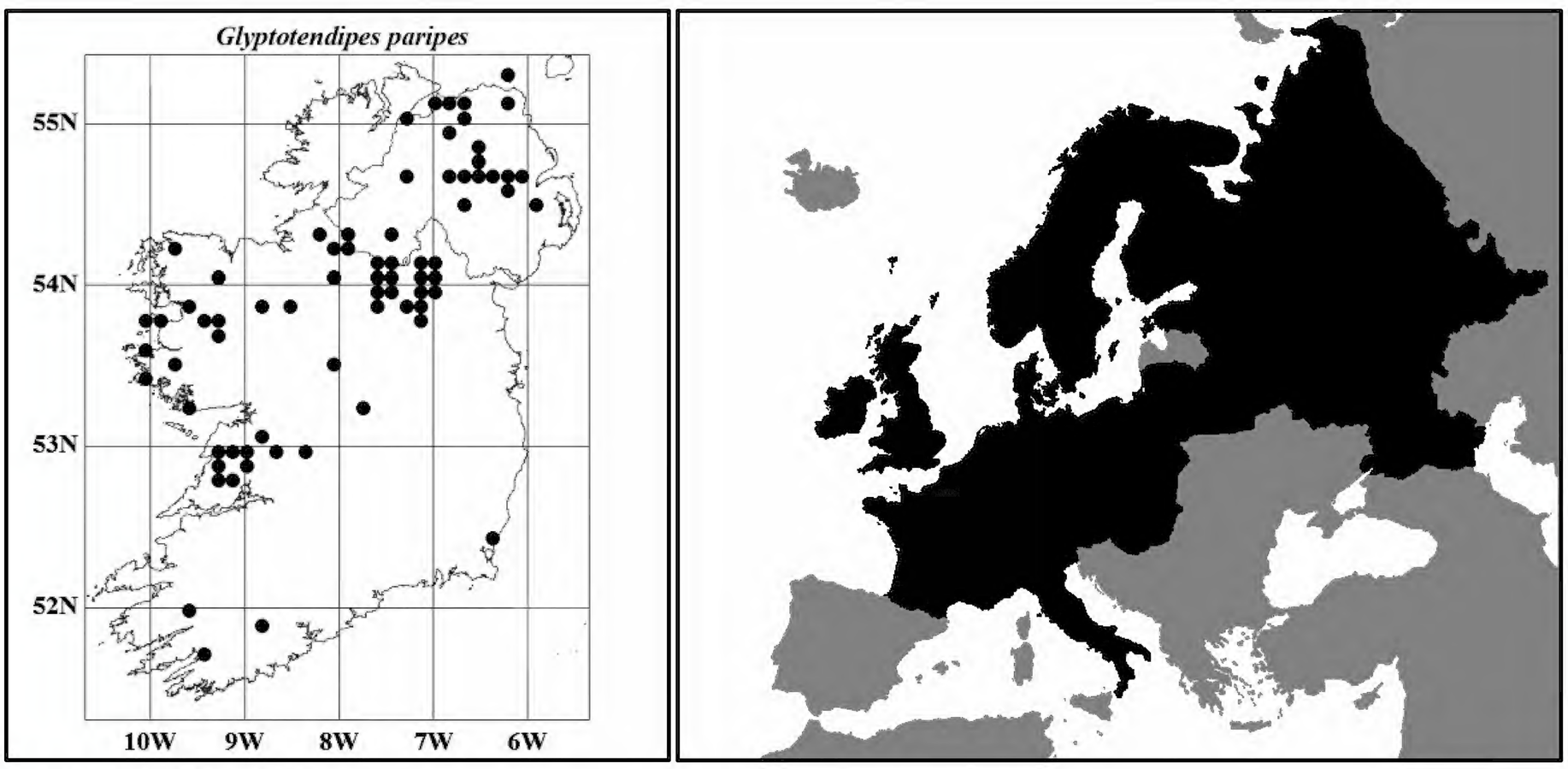
FIGURES 711-712. *Glyptotendipes cauliginellus* (Kieffer, 1913).



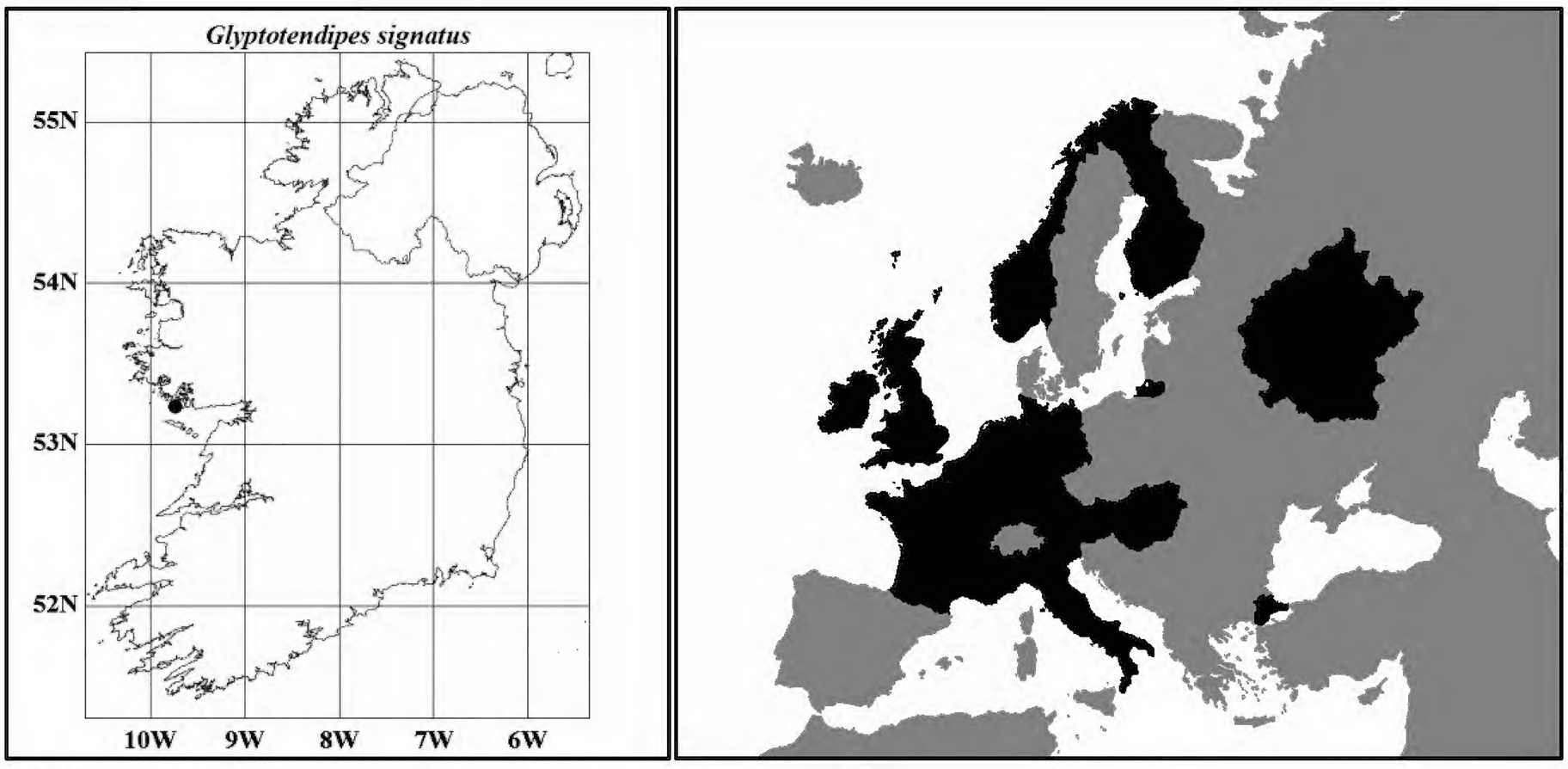
FIGURES 713-714. *Glyptotendipes glaucus* (Meigen, 1818).



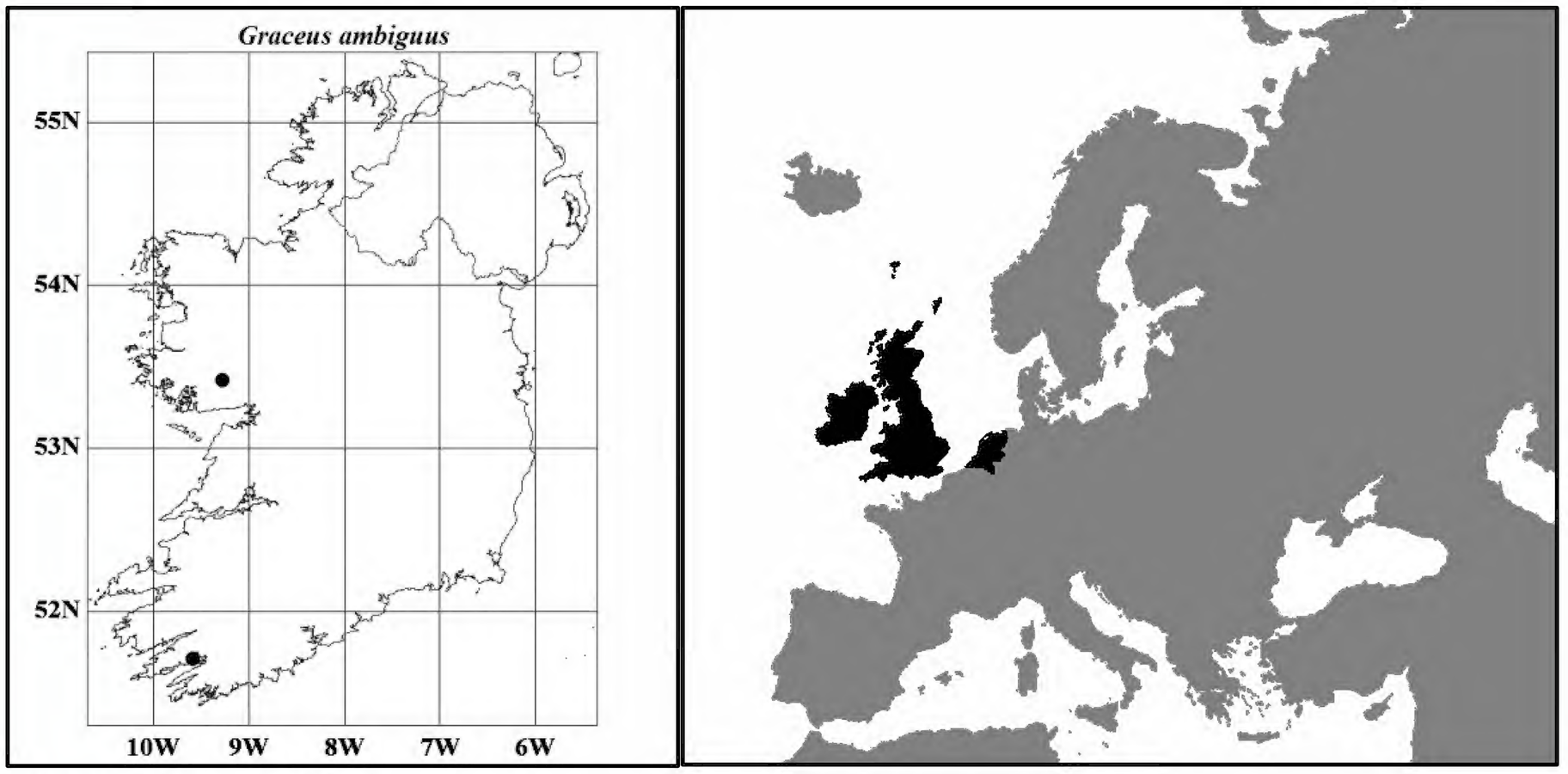
FIGURES 715-716. *Glyptotendipes pallens* (Meigen, 1804).



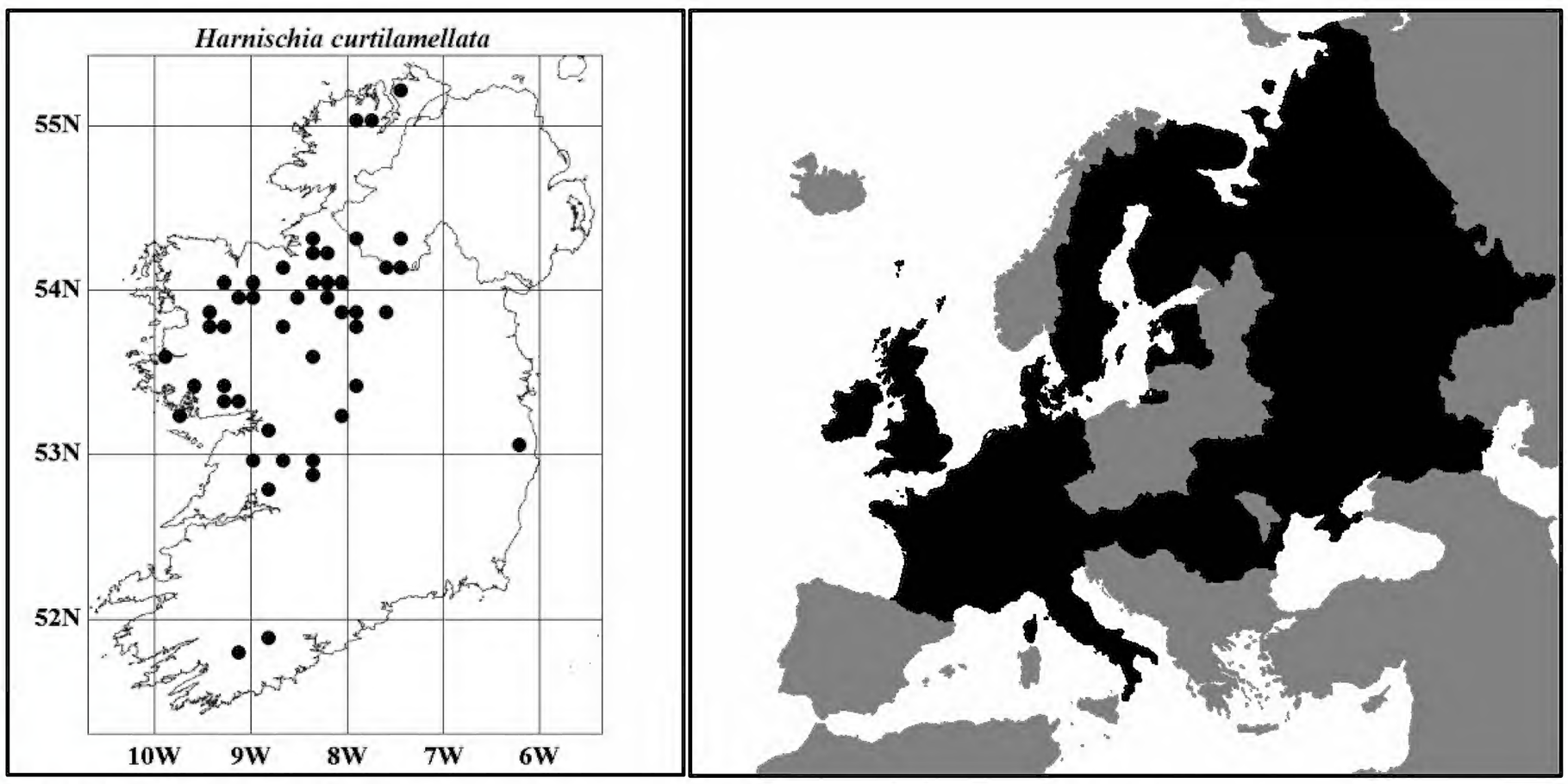
FIGURES 717-718. *Glyptotendipes paripes* (Edwards, 1929).



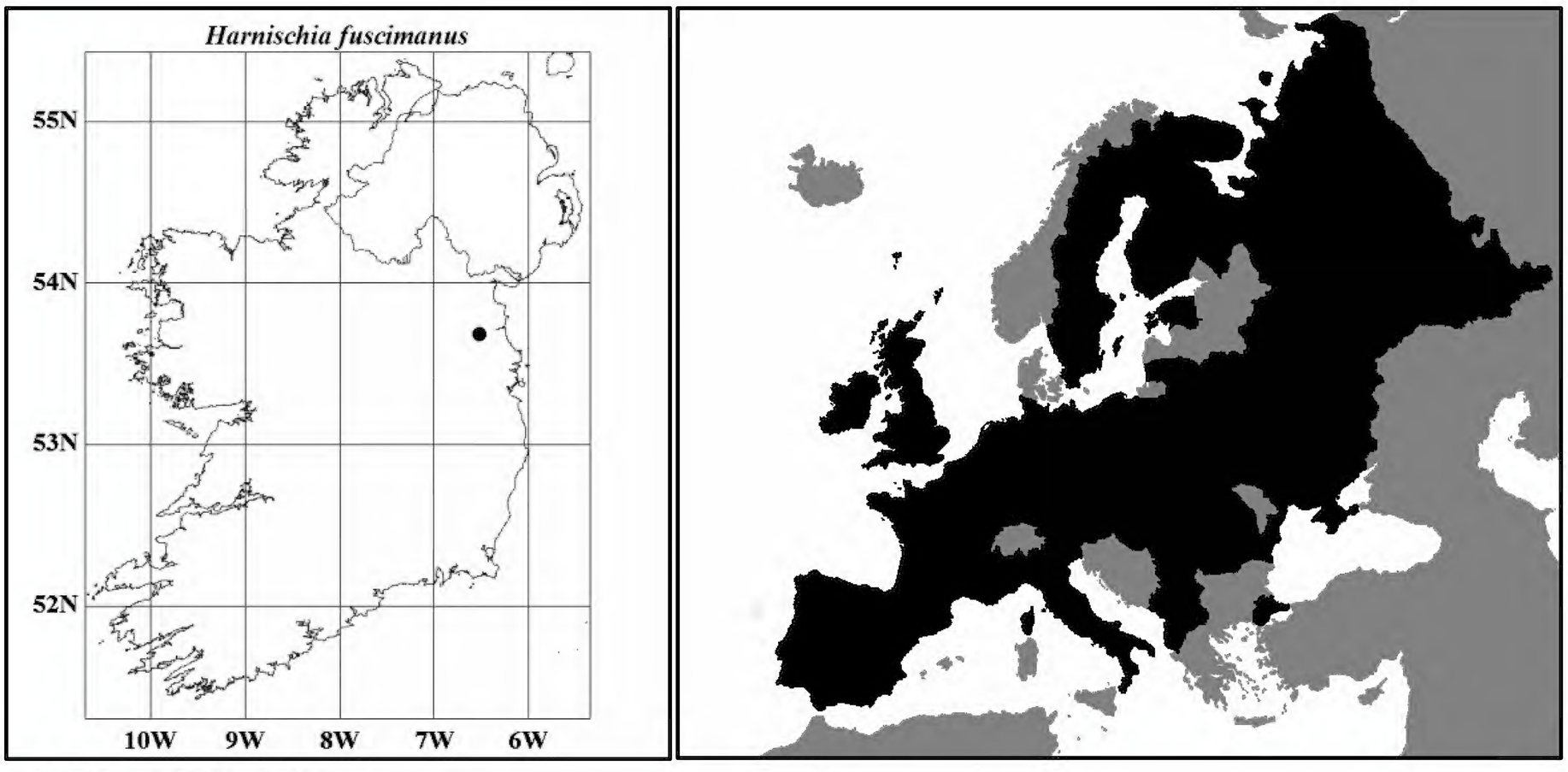
FIGURES 719-720. *Glyptotendipes signatus* (Kieffer, 1909).



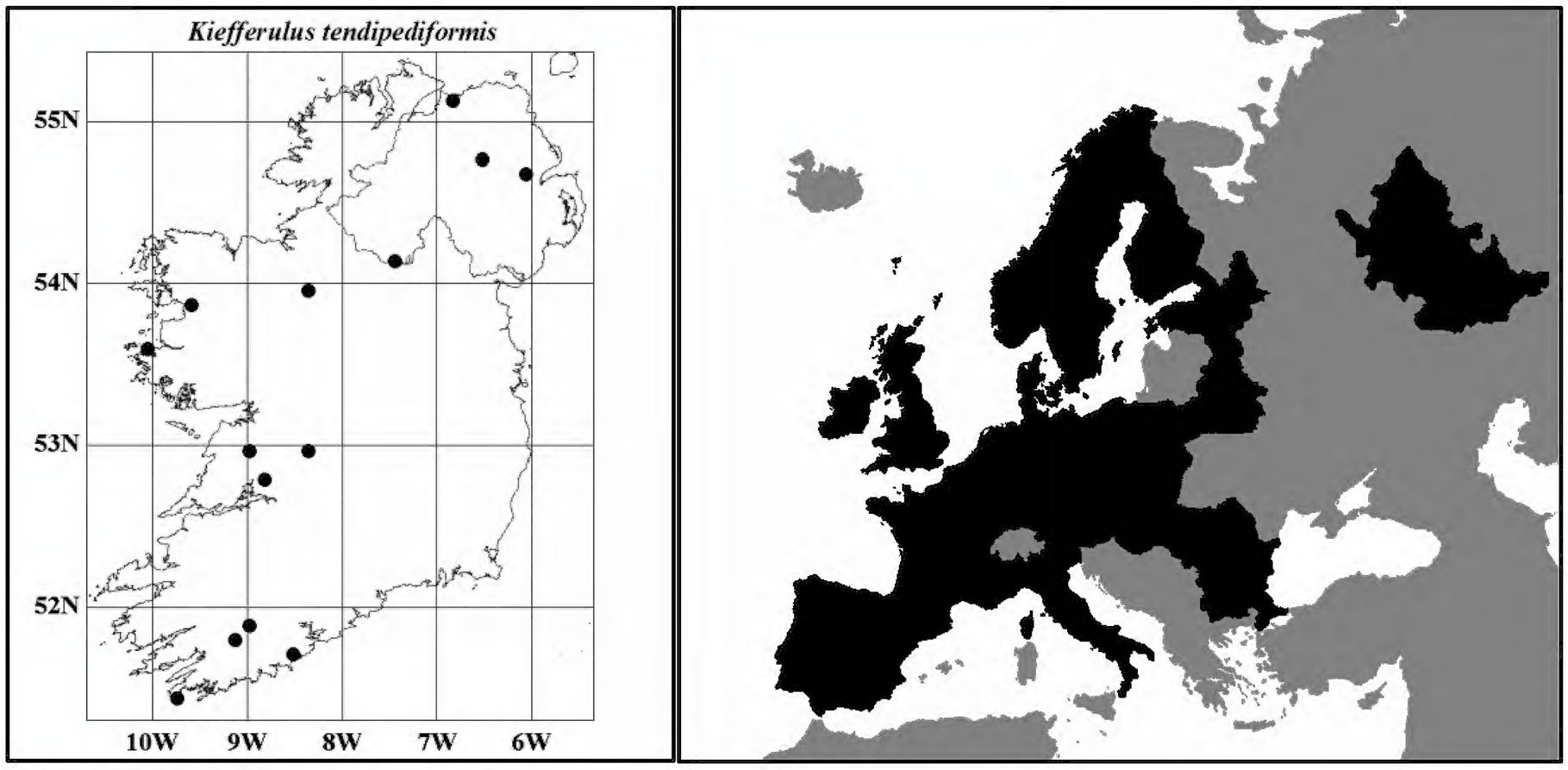
FIGURES 721-722. *Graceus ambiguus* Goetghebuer, 1928.



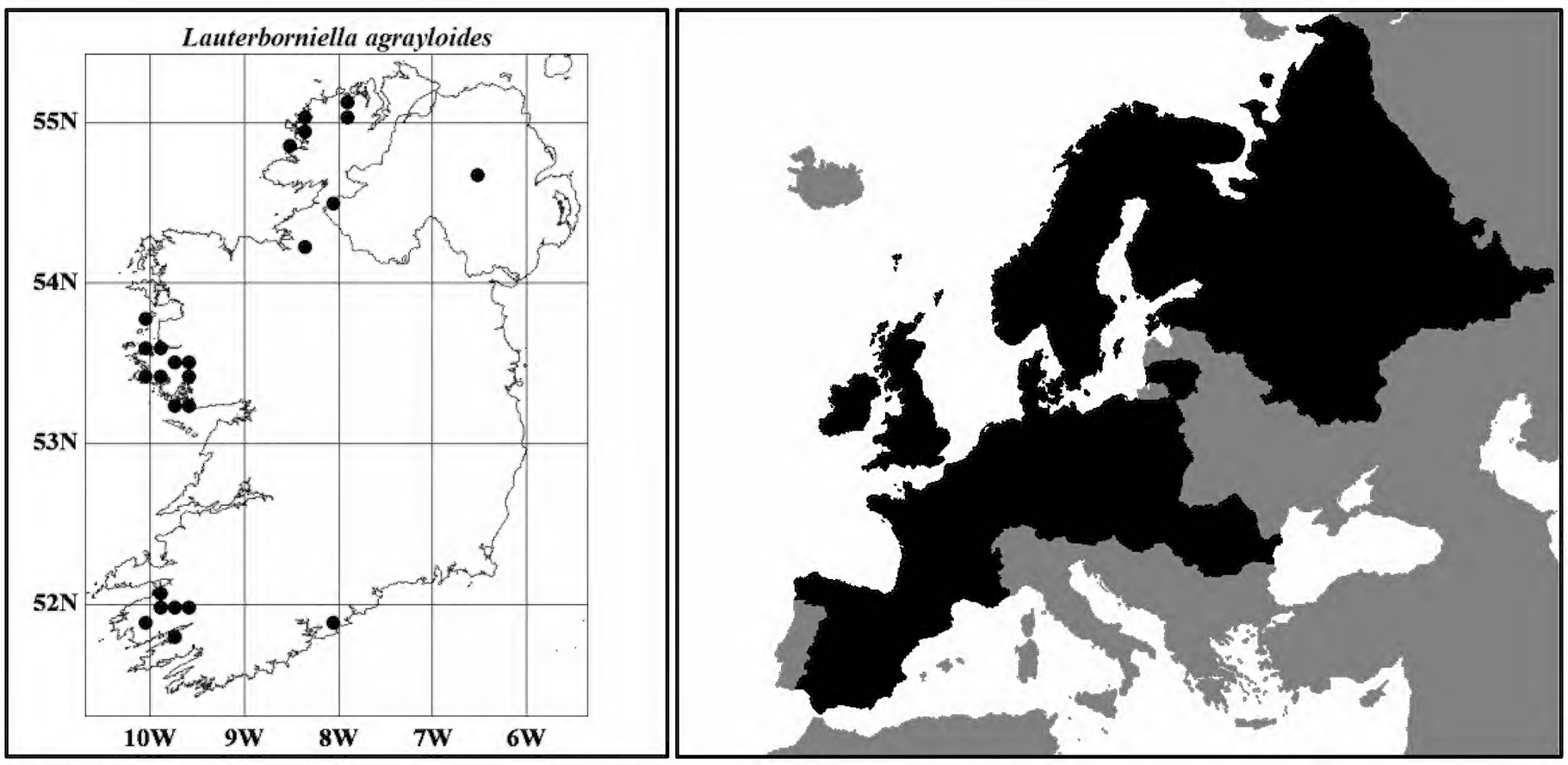
FIGURES 723-724. *Harnischia curtilamellata* (Malloch, 1915).



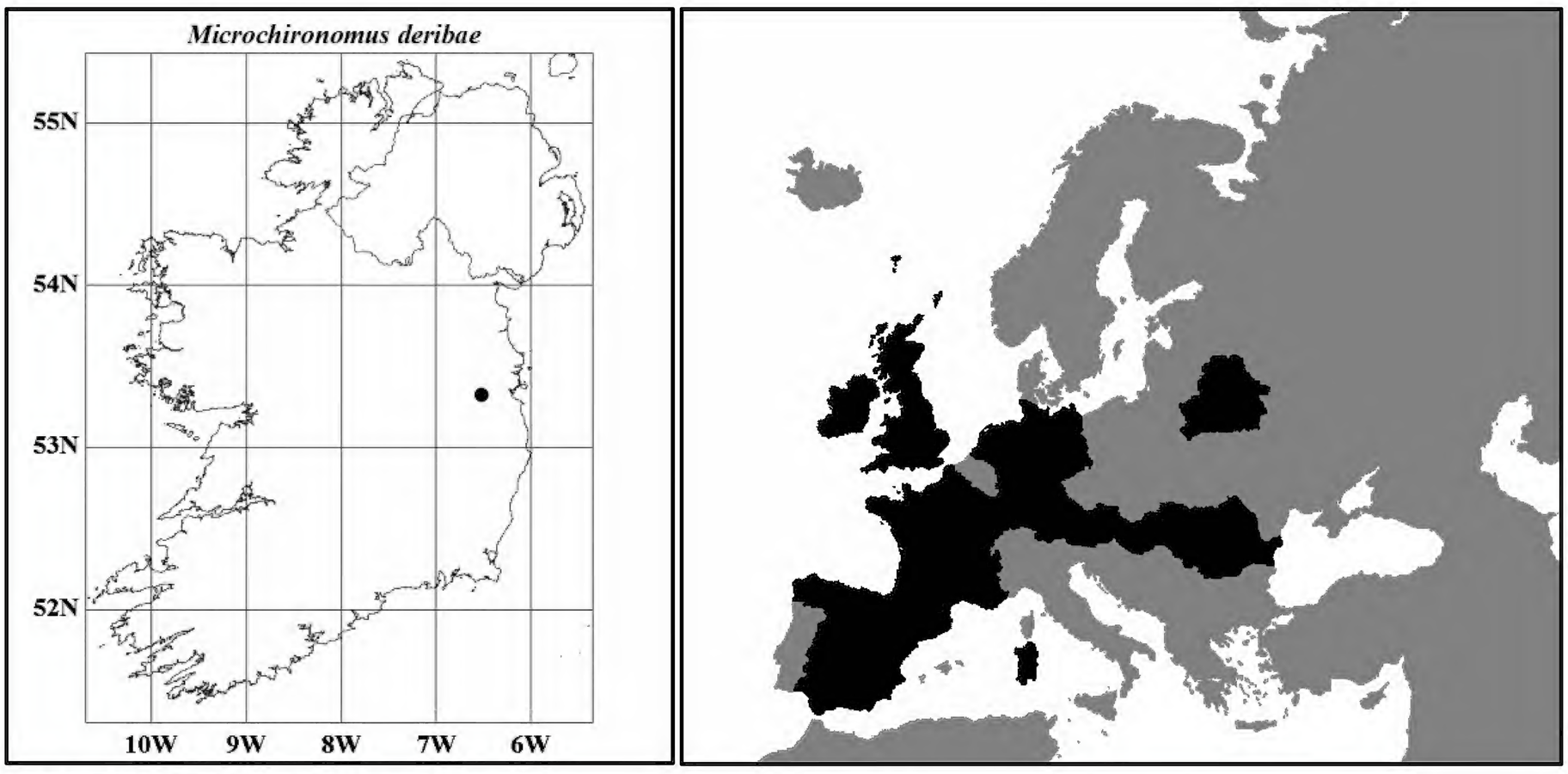
FIGURES 725-726. *Harnischia fuscimanus* Kieffer, 1921.



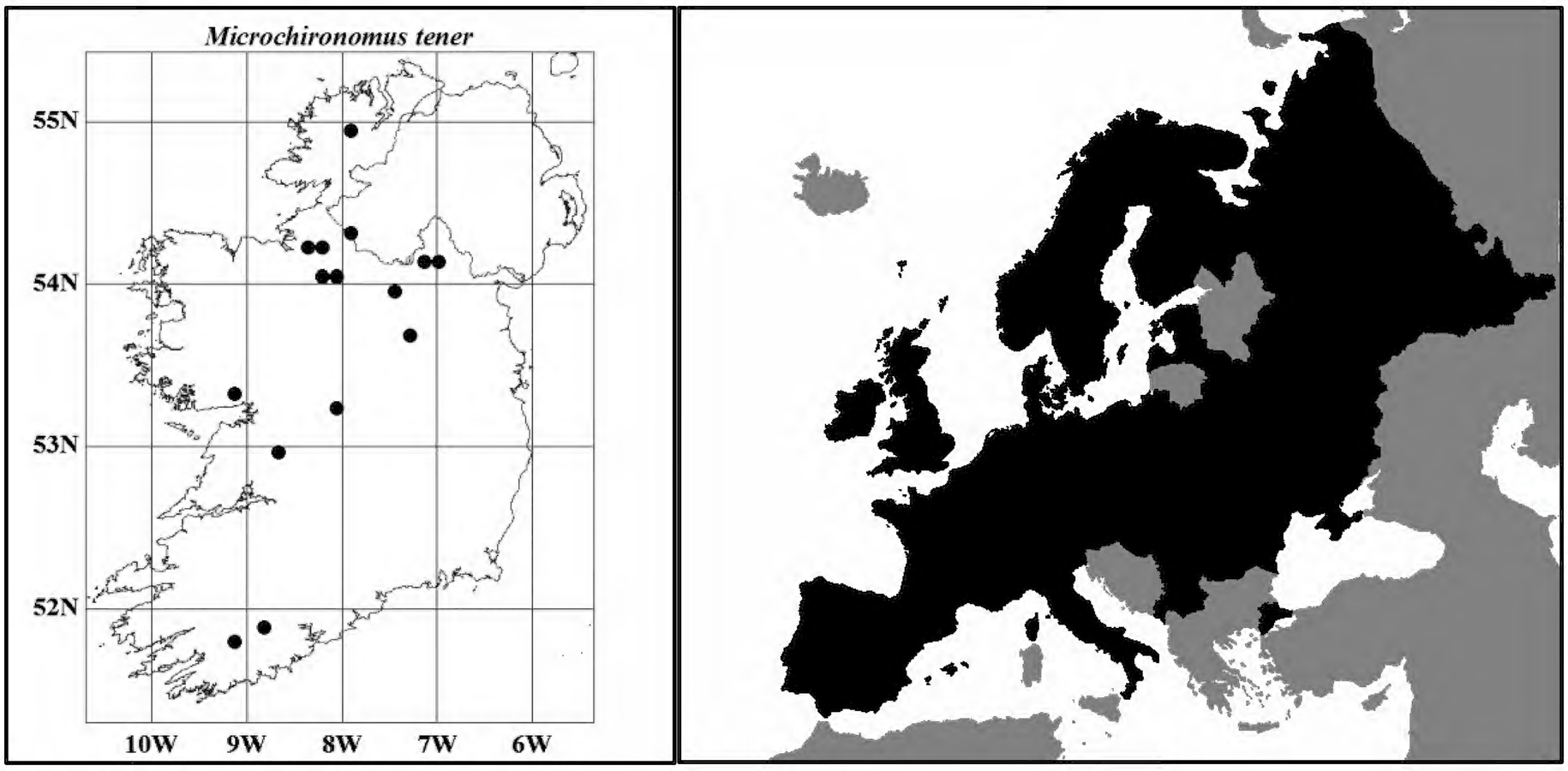
FIGURES 727-728. *Kiefferulus tendipediformis* (Goetghebuer, 1921).



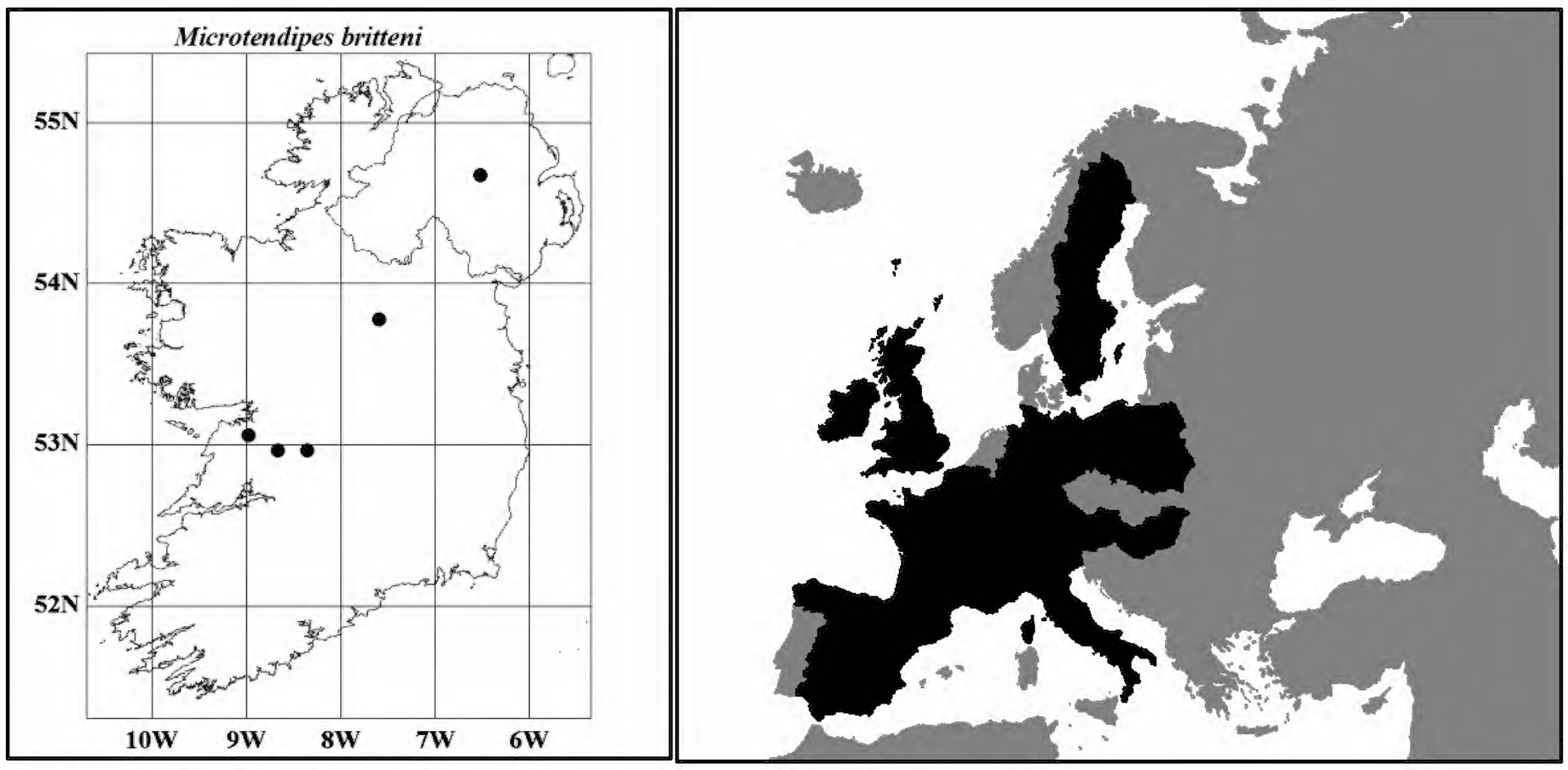
FIGURES 729-730. *Lauterborniella agrayloides* (Kieffer, 1911).



FIGURES 731-732. *Microchironomus deribae* (Freeman, 1957).

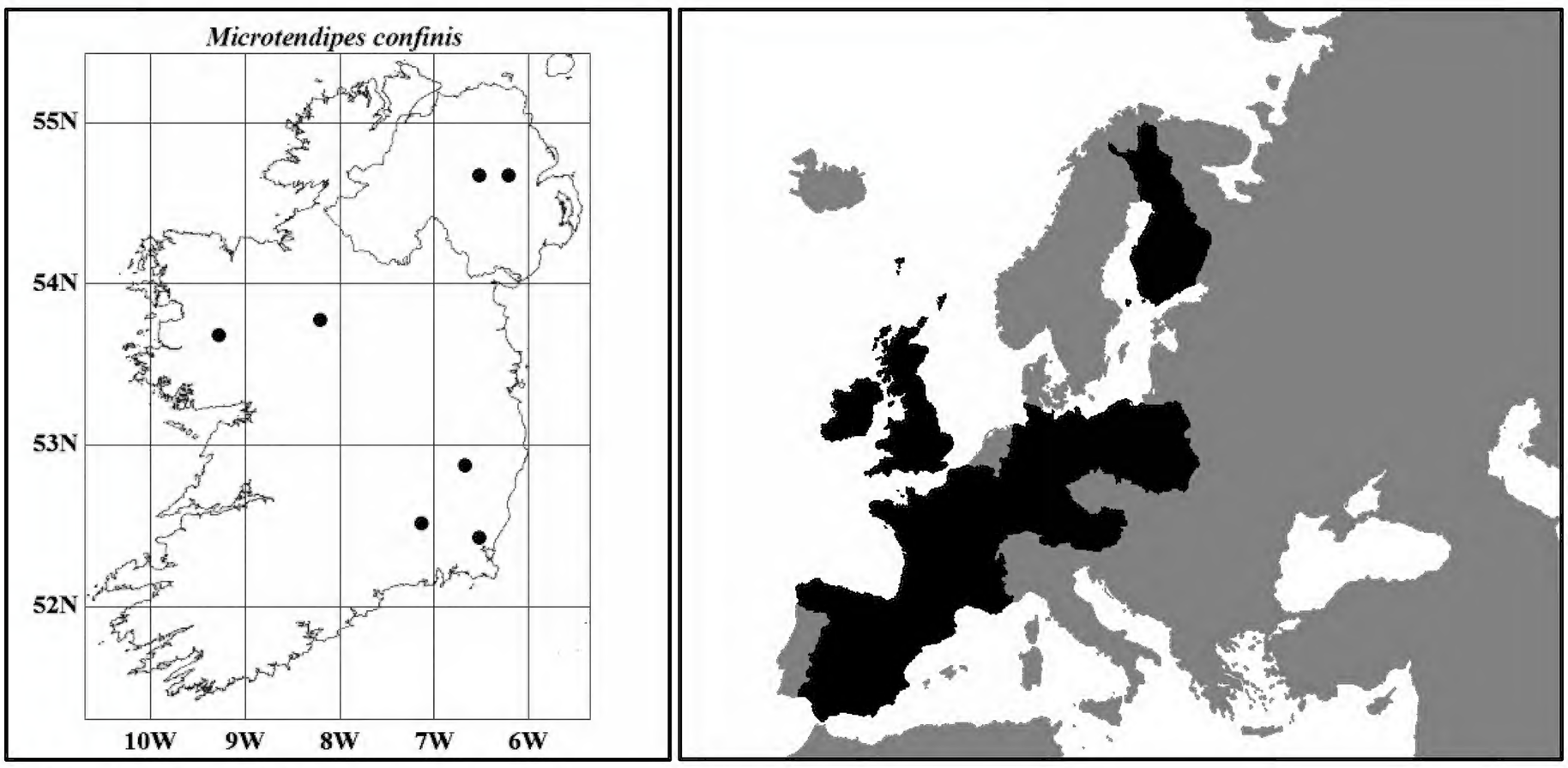


FIGURES 733-734. *Microchironomus tener* (Kieffer, 1918).

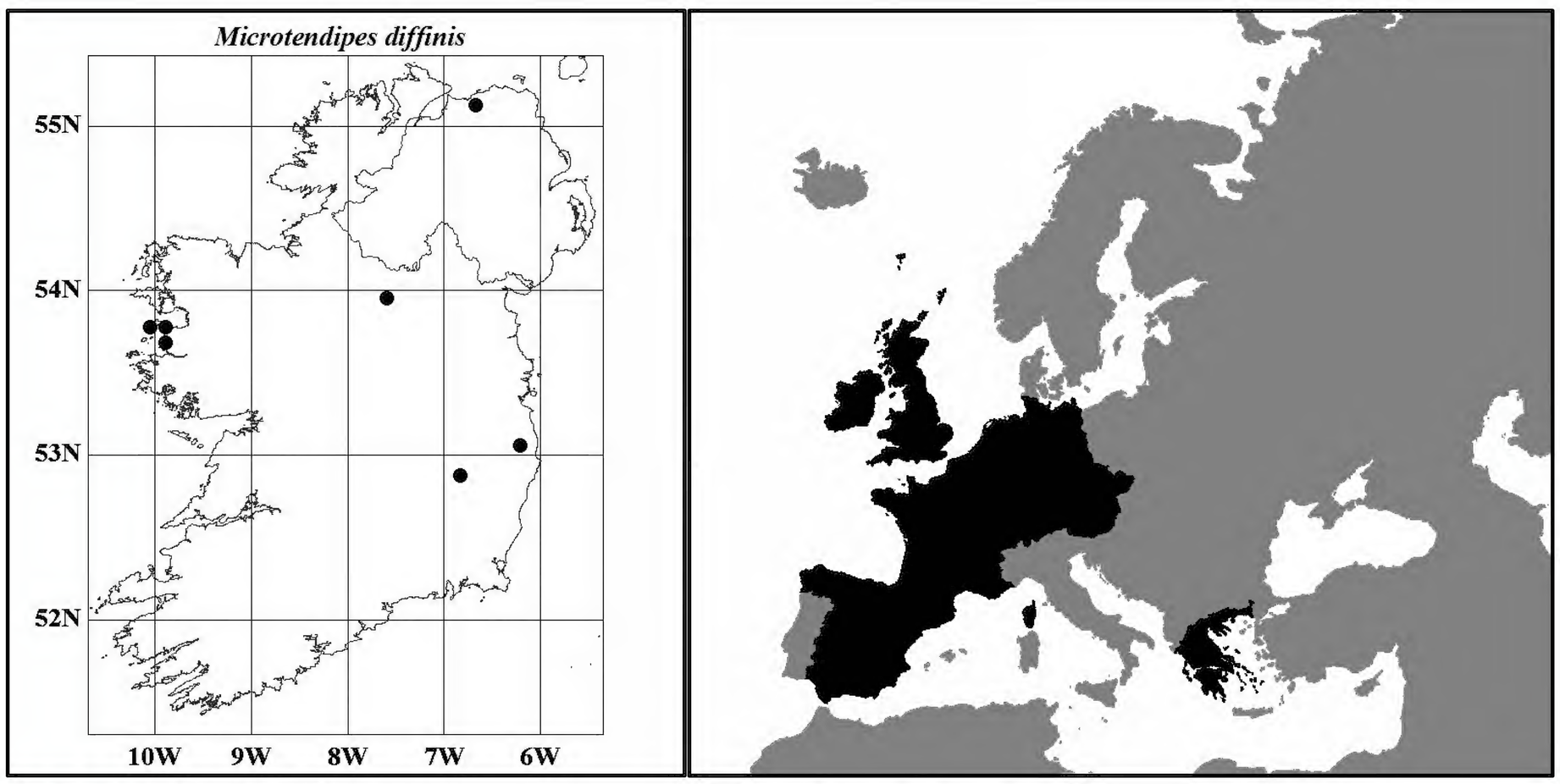


FIGURES 735-736. *Microtendipes britteni* (Edwards, 1929).

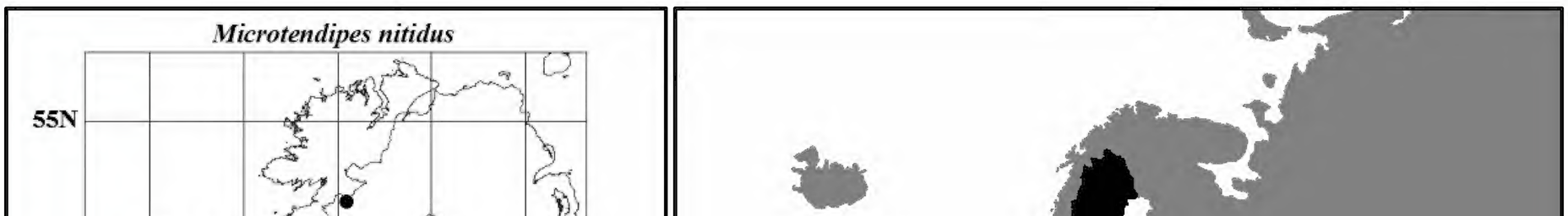
FIGURES 737-738. *Microtendipes chloris* (Meigen, 1818).



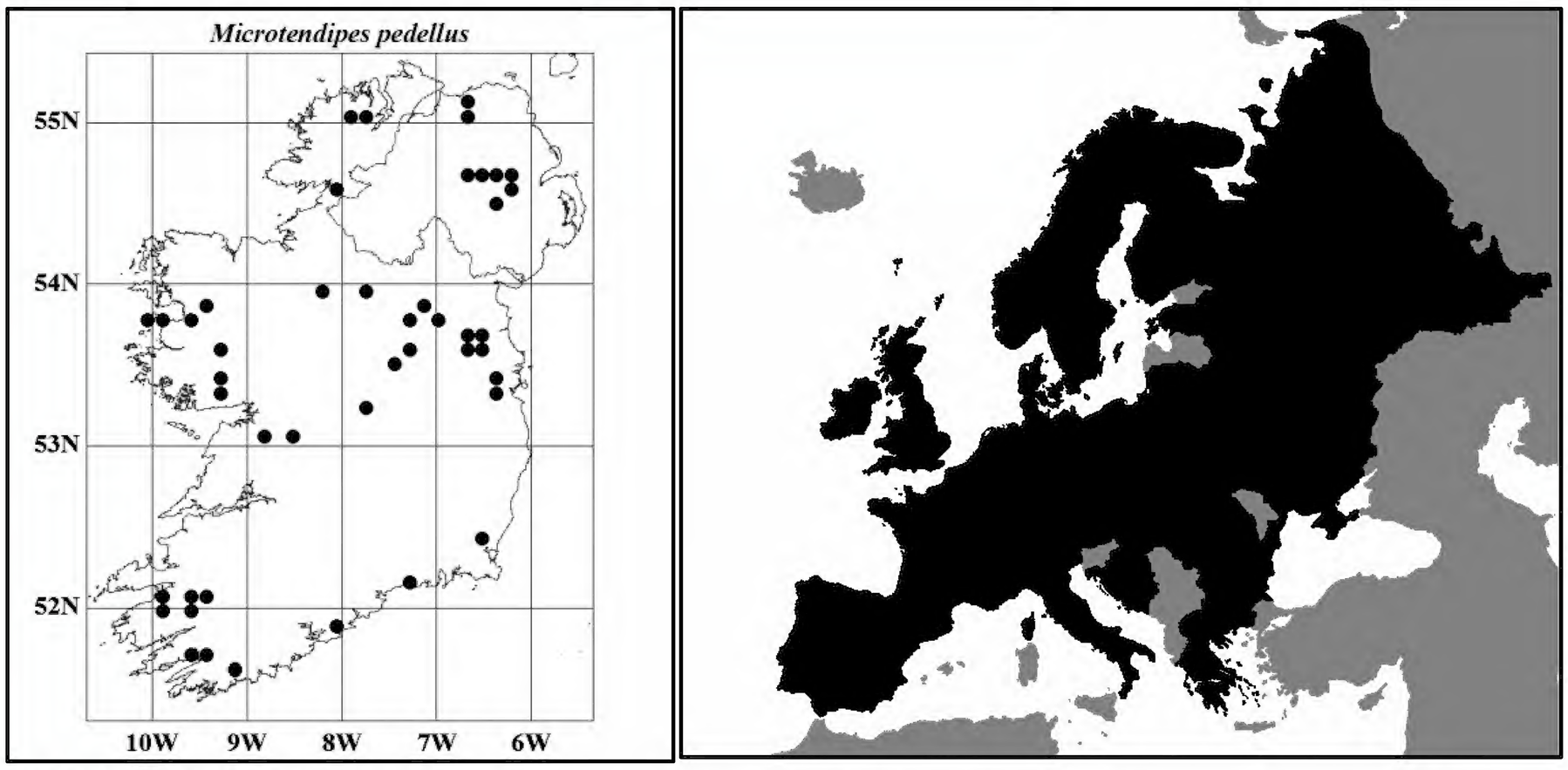
FIGURES 739-740. *Microtendipes confinis* (Meigen, 1830).



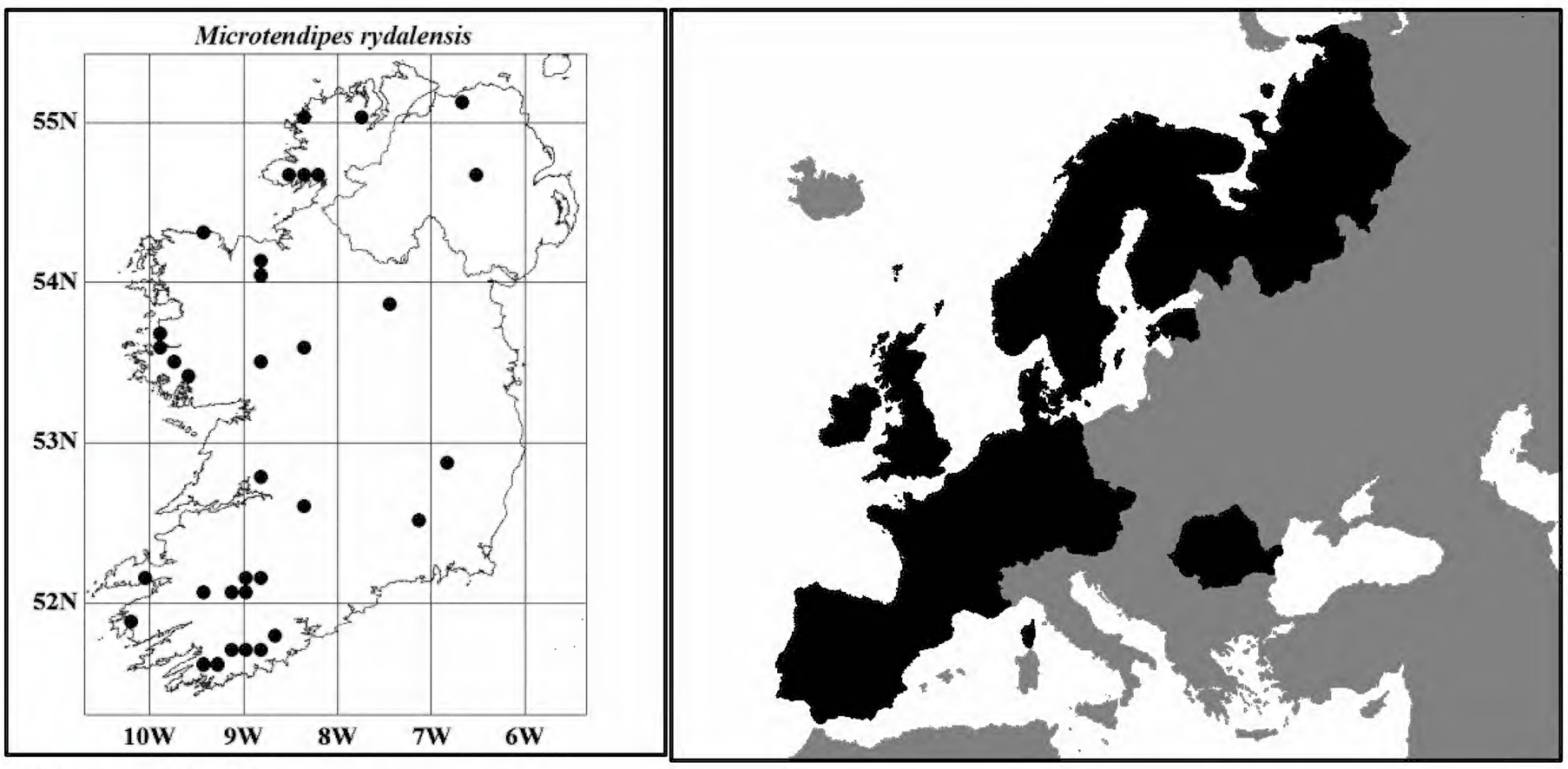
FIGURES 741-742. *Microtendipes diffinis* (Edwards, 1929).



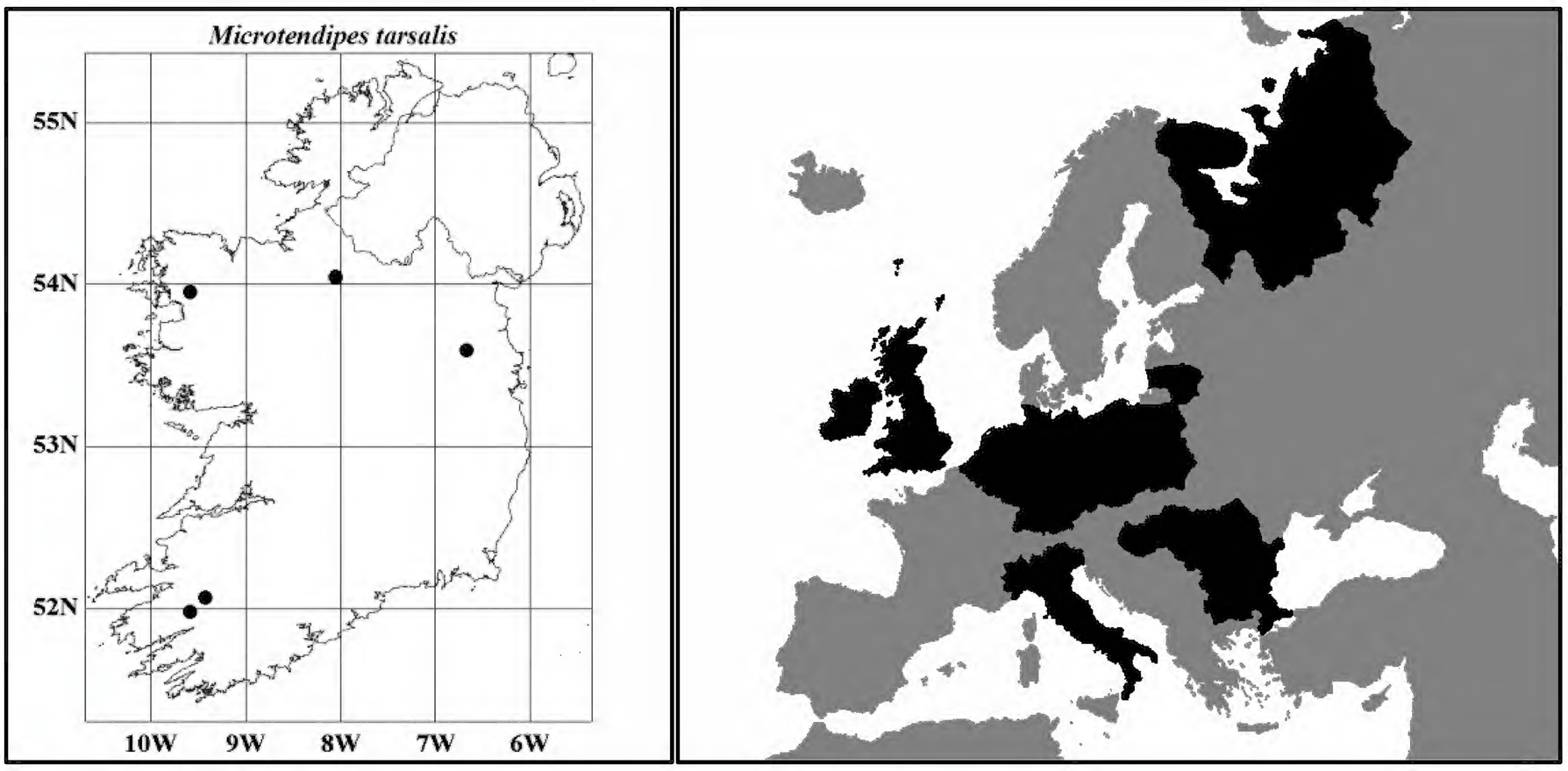
FIGURES 743-744. *Microtendipes nitidus* (Meigen, 1818).



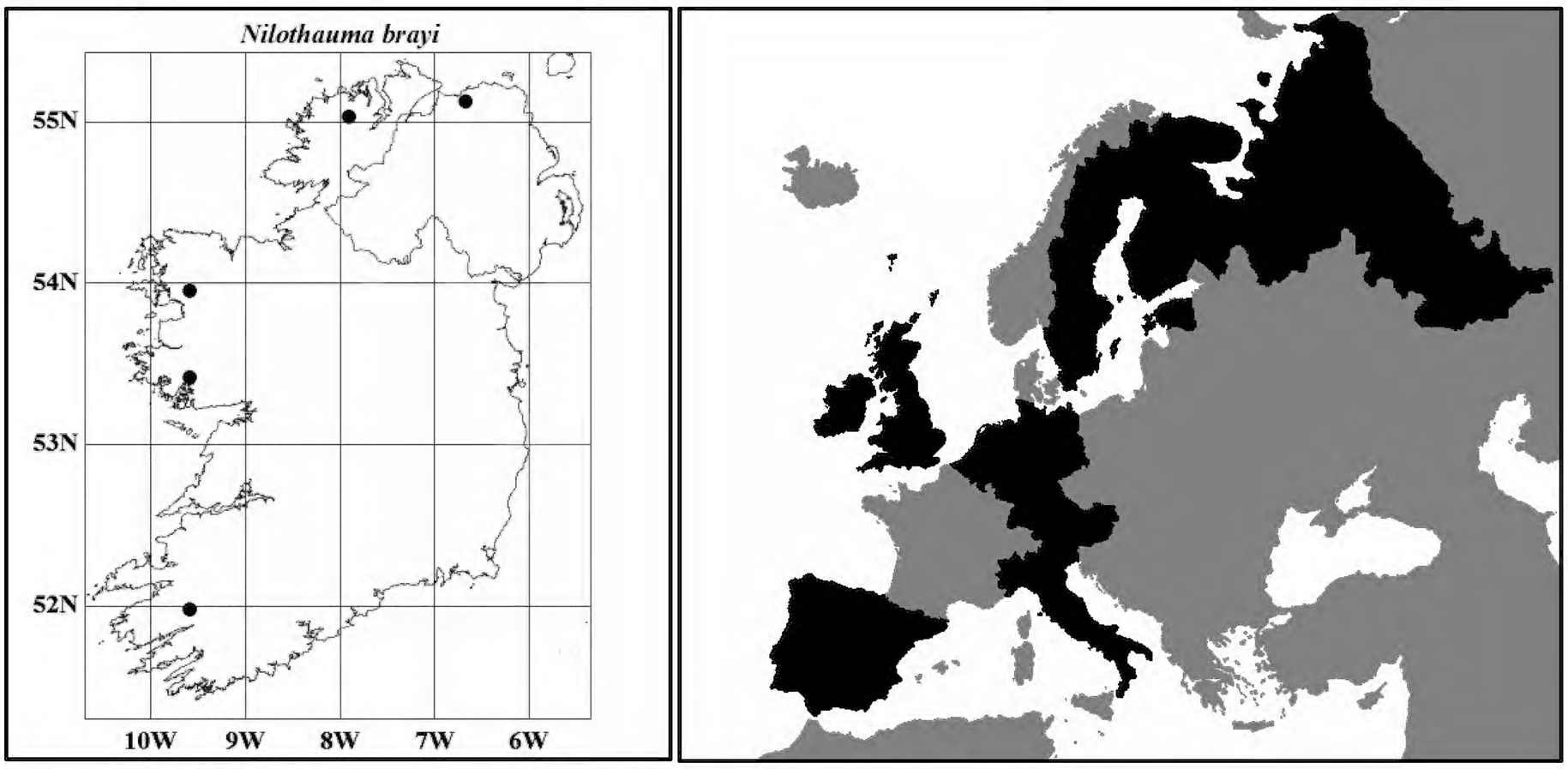
FIGURES 745-746. *Microtendipes pedellus* (De Geer, 1776).



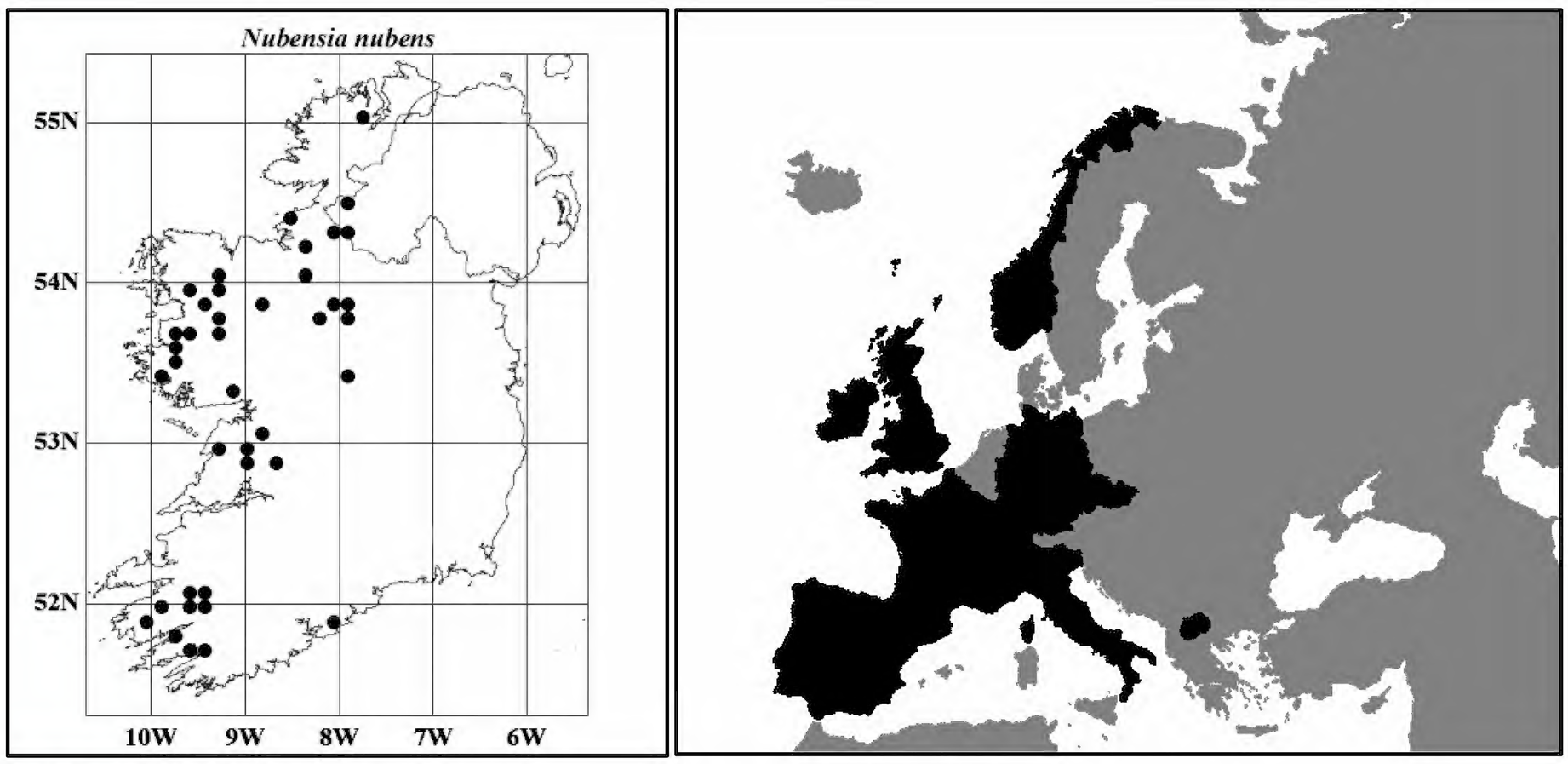
FIGURES 747-748. *Microtendipes rydalensis* (Edwards, 1929).



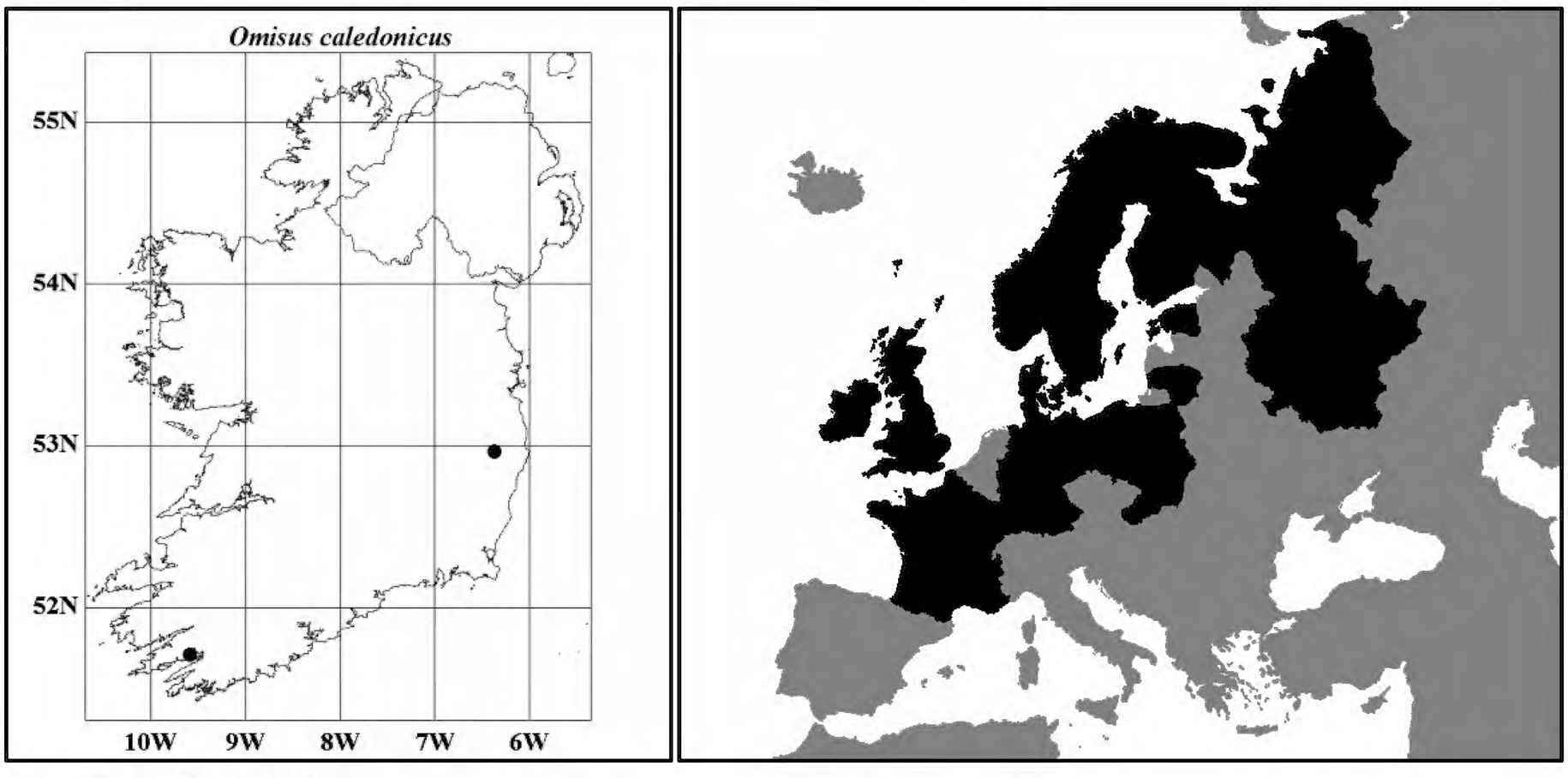
FIGURES 749-750. *Microtendipes tarsalis* (Walker, 1856).



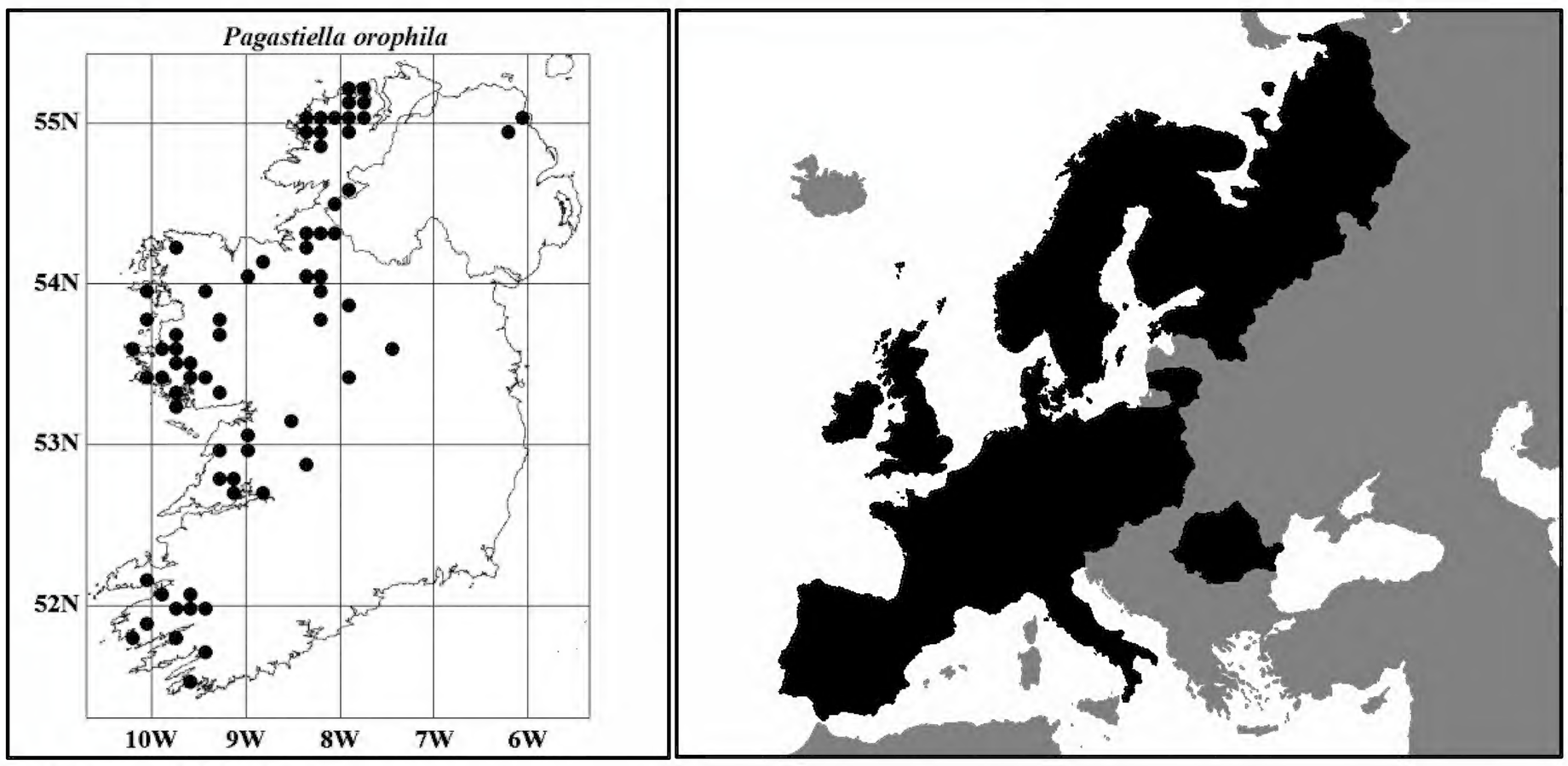
FIGURES 751-752. *Nilothauma brayi* (Goetghebuer, 1921).



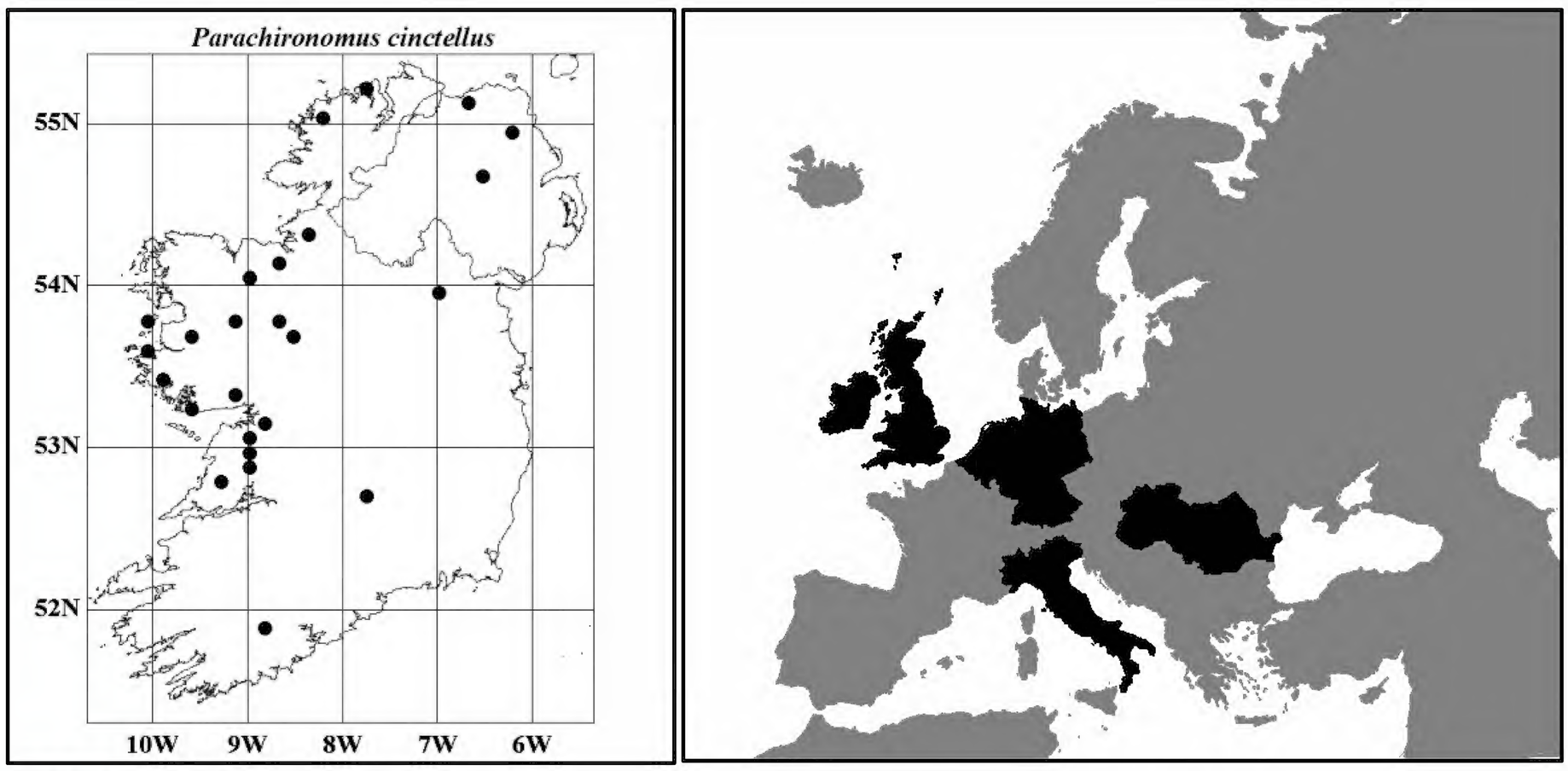
FIGURES 753-754. *Nubensia nubens* (Edwards, 1929).



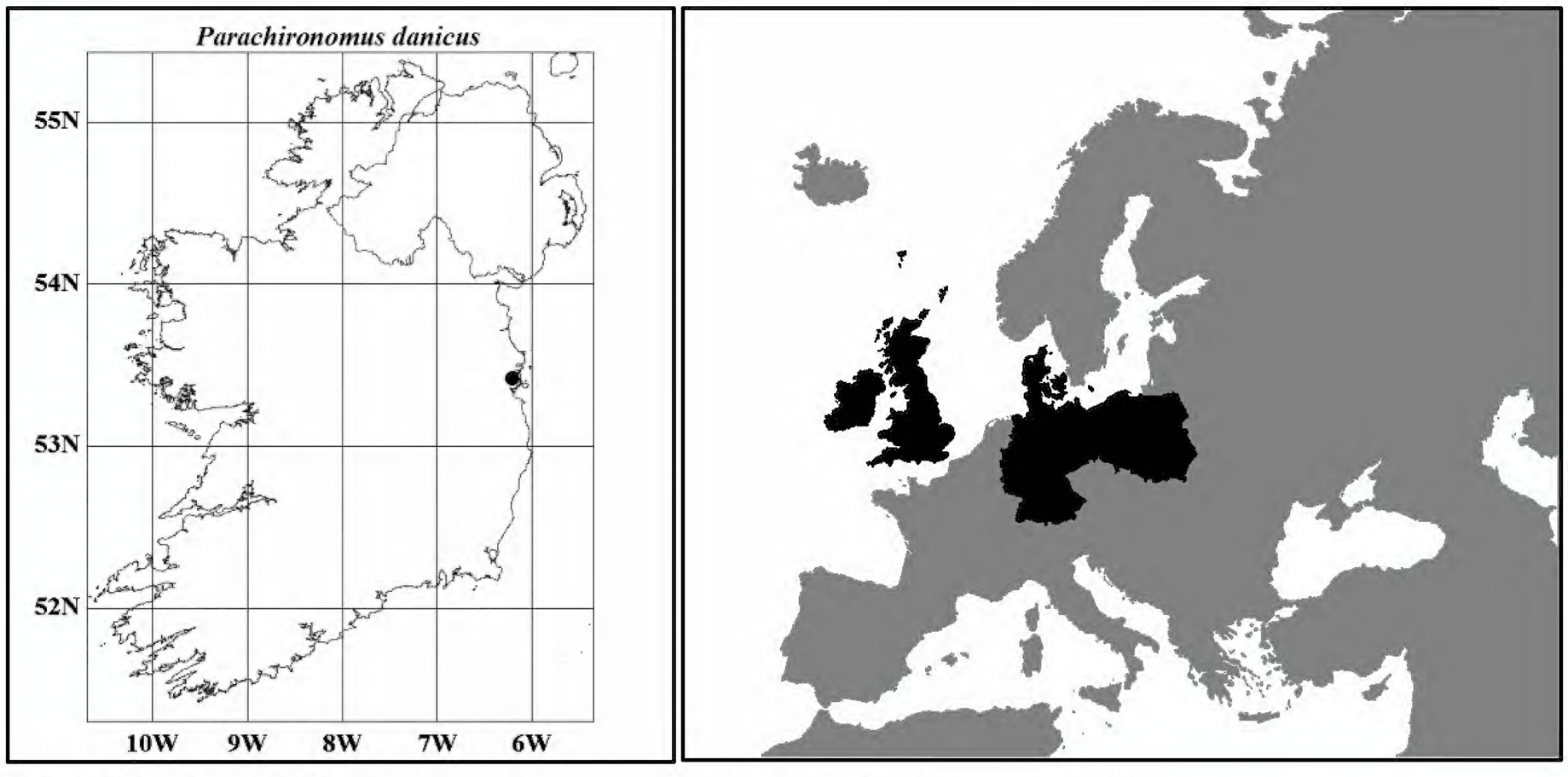
FIGURES 755-756. *Omisus caledonicus* (Edwards, 1932).



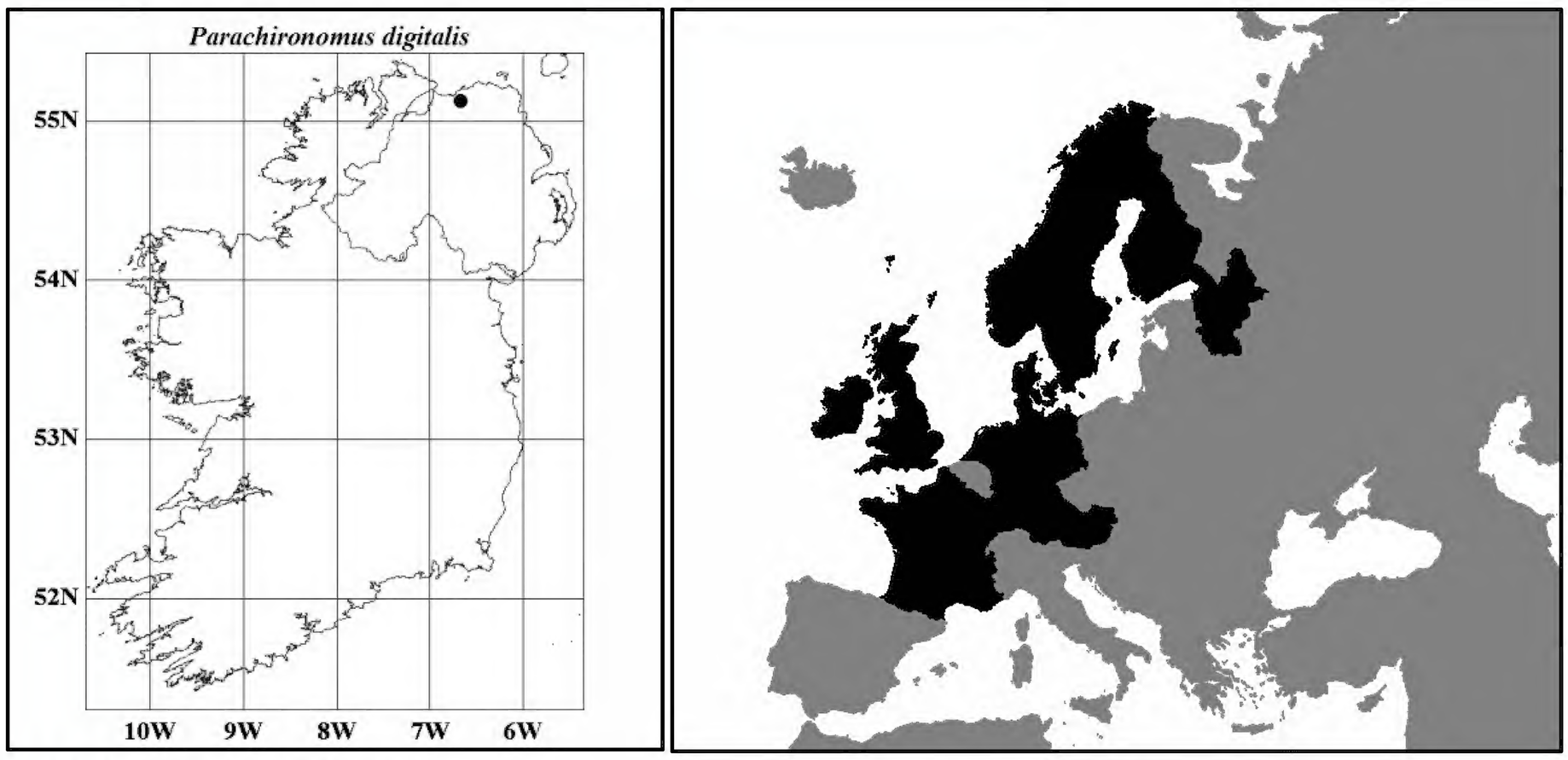
FIGURES 757-758. *Pagastiella orophila* (Edwards, 1929).



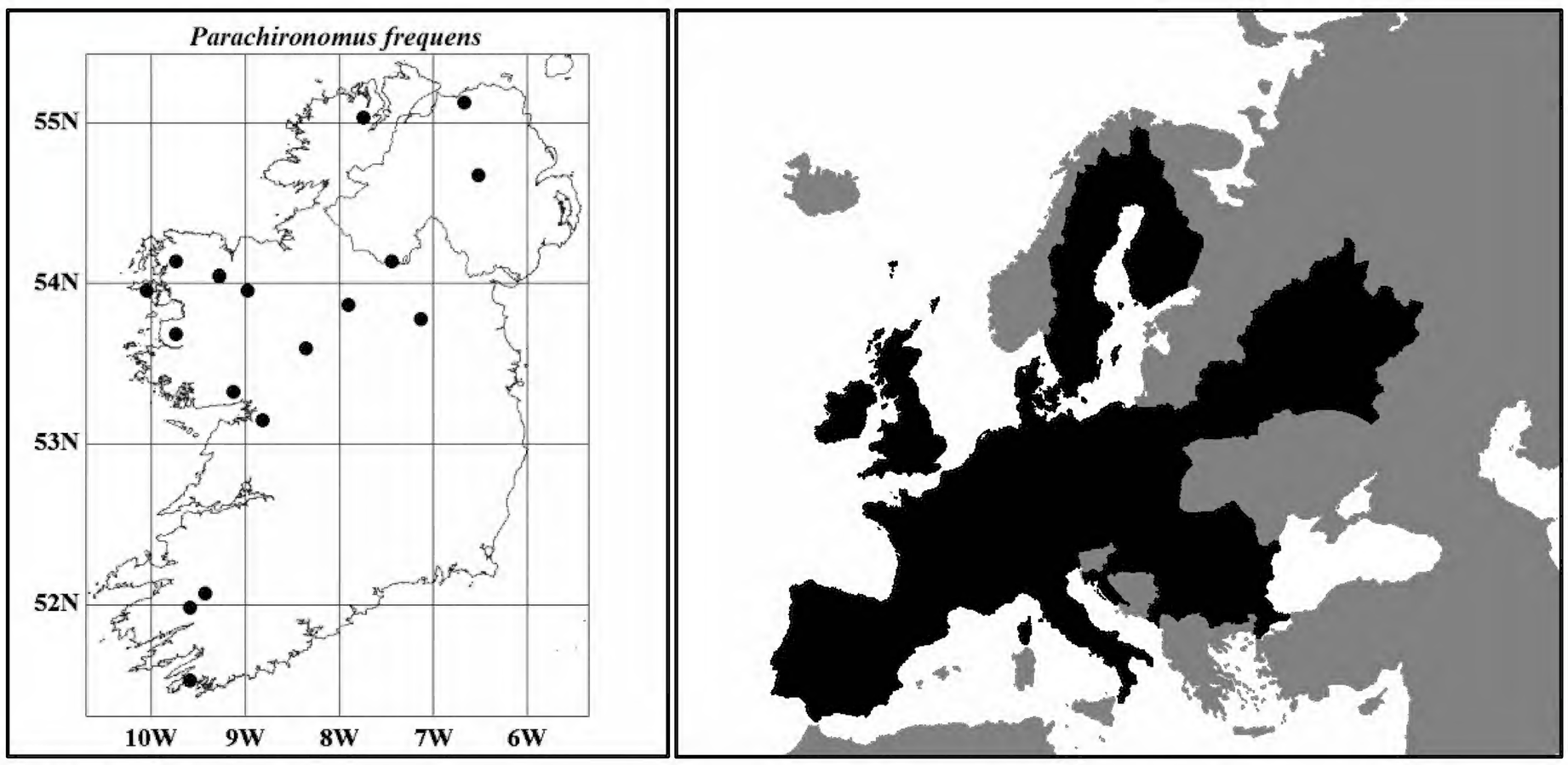
FIGURES 759-760. *Parachironomus cinctellus* (Goetghebuer, 1921).



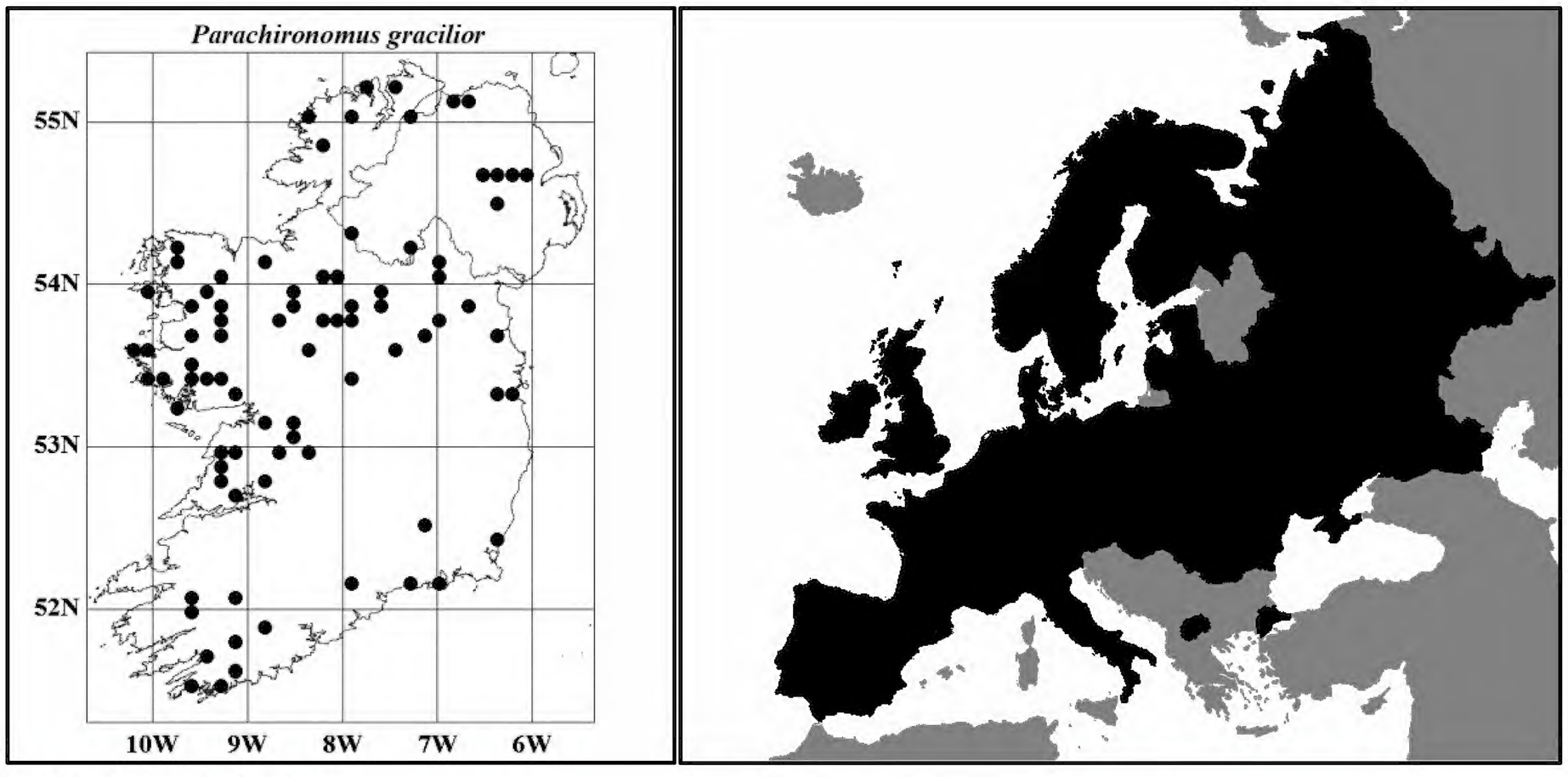
FIGURES 761-762. *Parachironomus danicus* Lehmann, 1970.



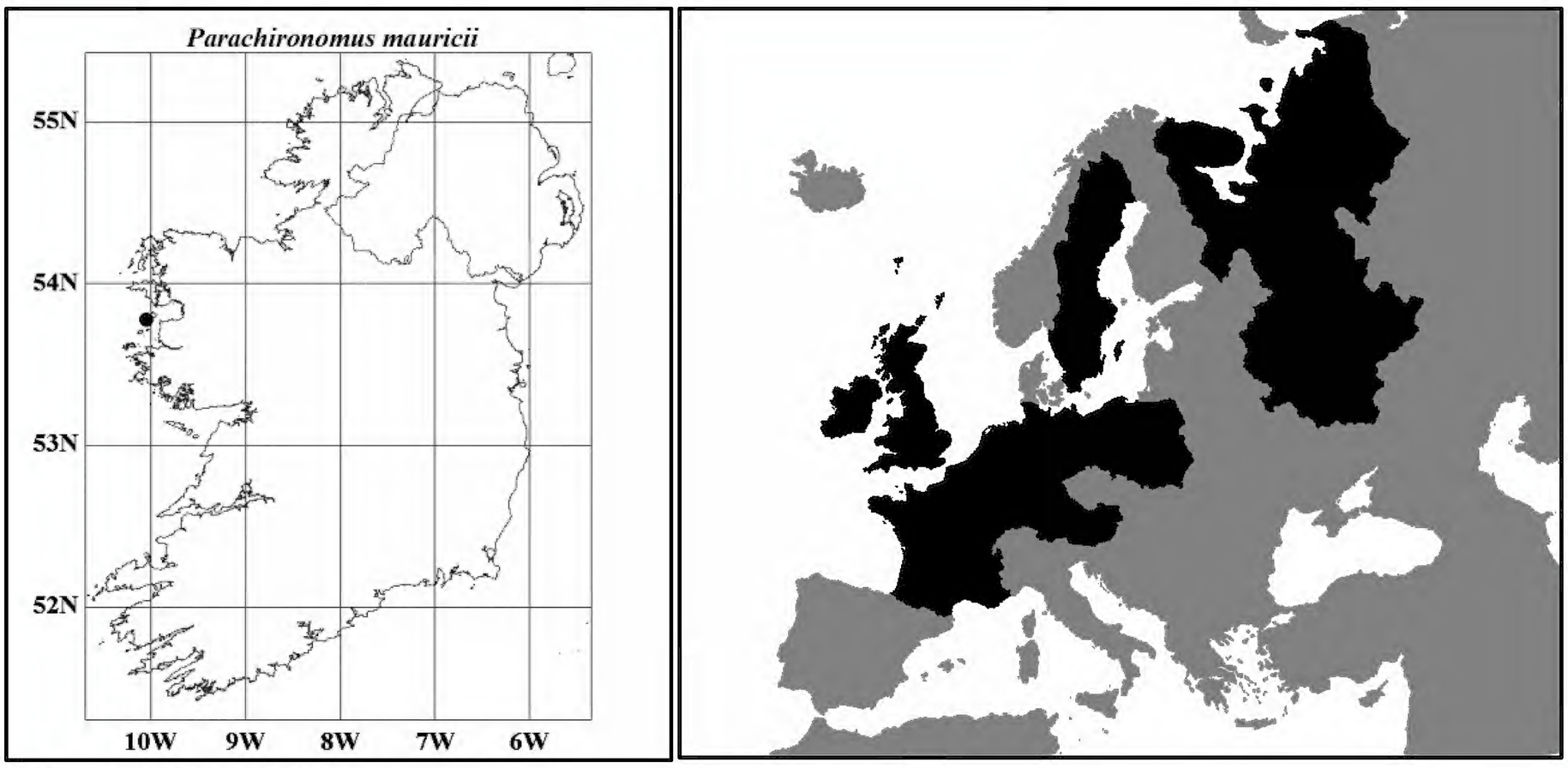
FIGURES 763-764. *Parachironomus digitalis* (Edwards, 1929).



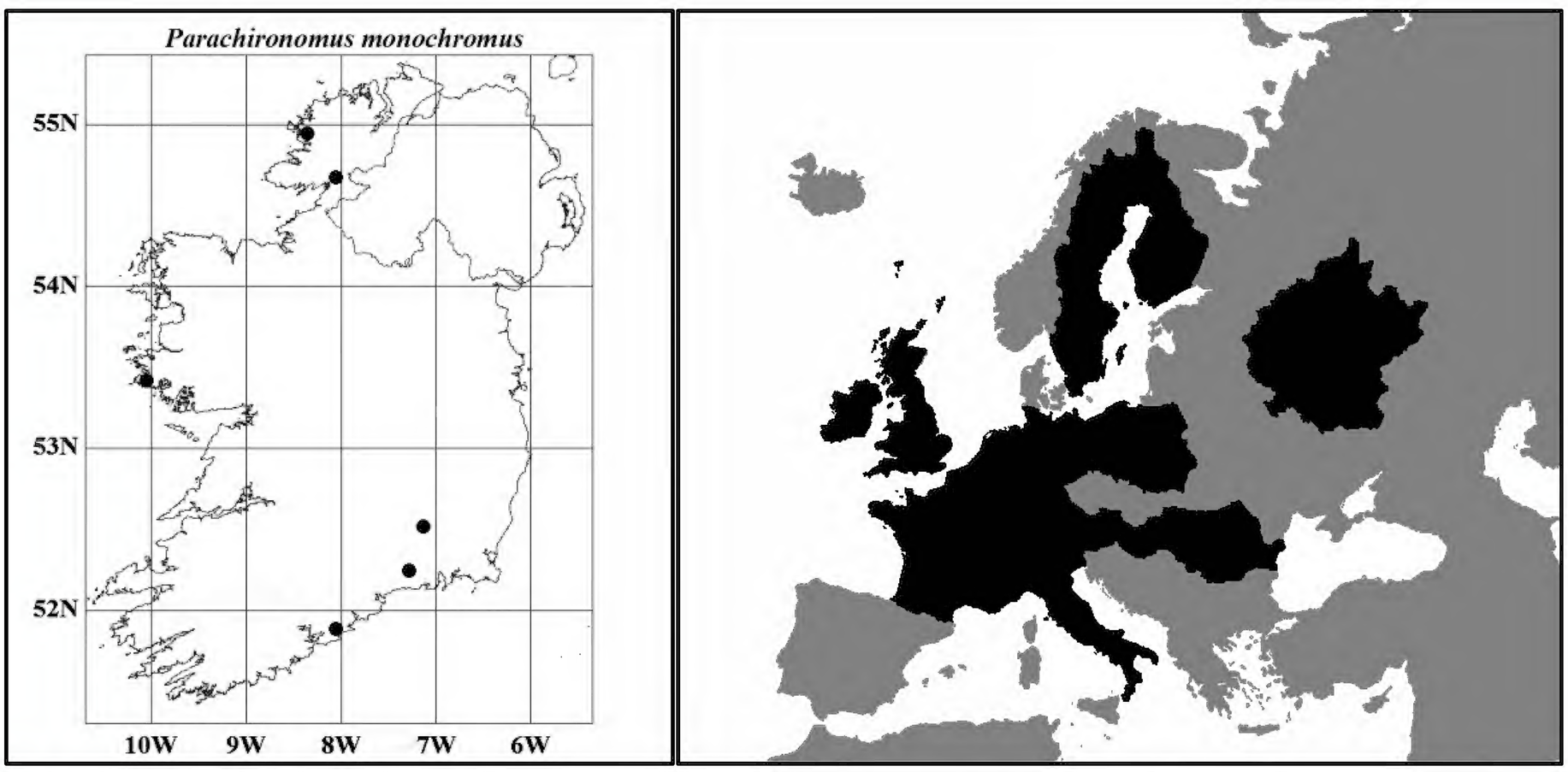
FIGURES 765-766. *Parachironomus frequens* (Johannsen, 1905).



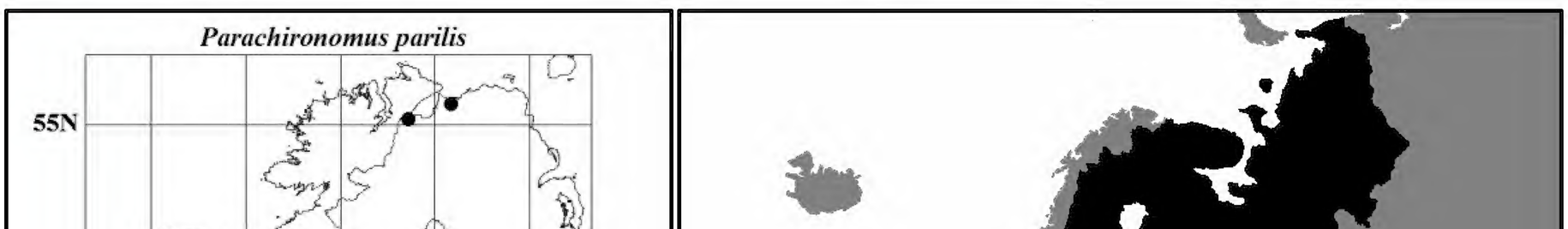
FIGURES 767-768. *Parachironomus gracilior* (Kieffer, 1918).



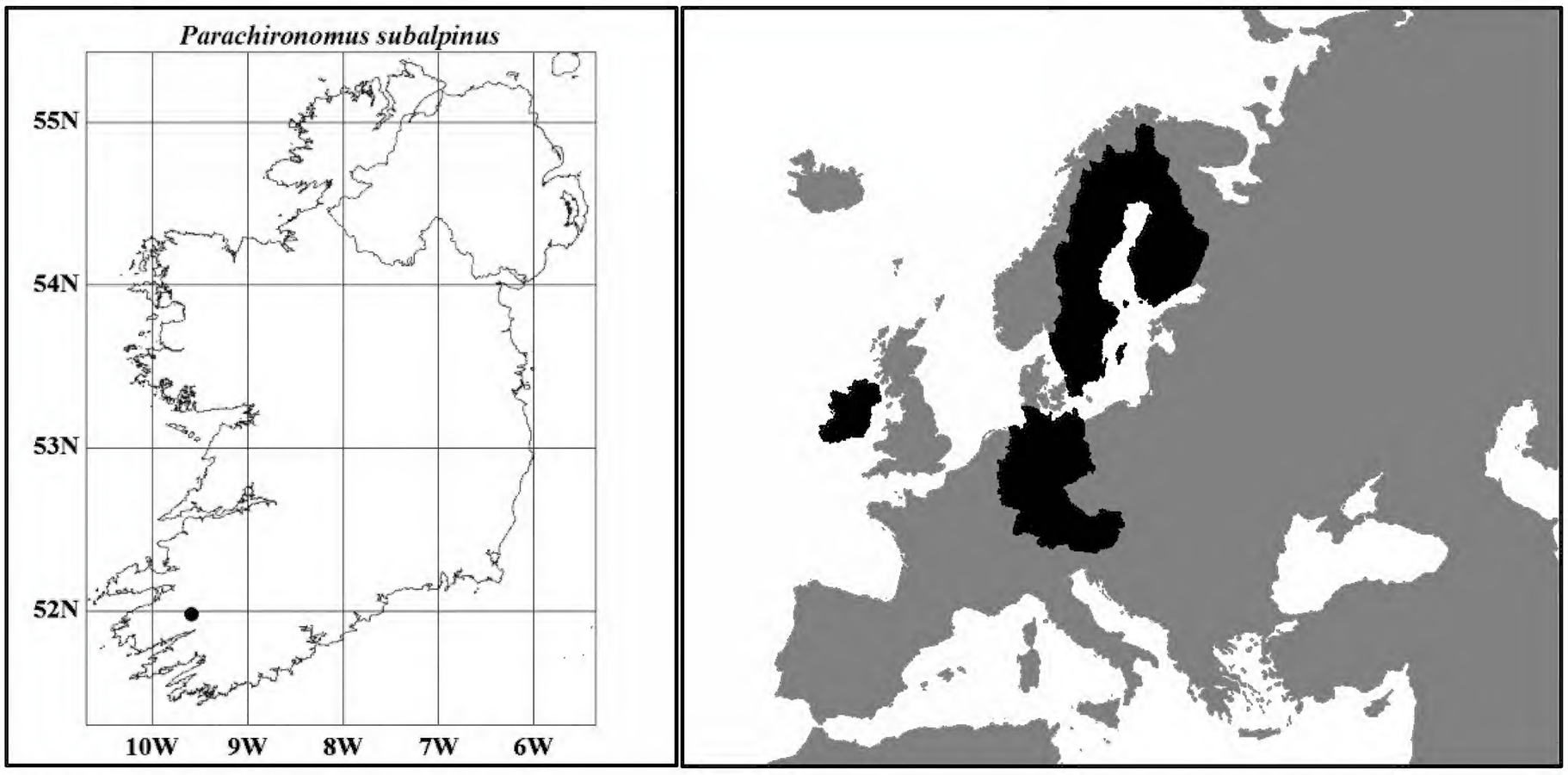
FIGURES 769-770. *Parachironomus mauricii* (Kruseman, 1933).



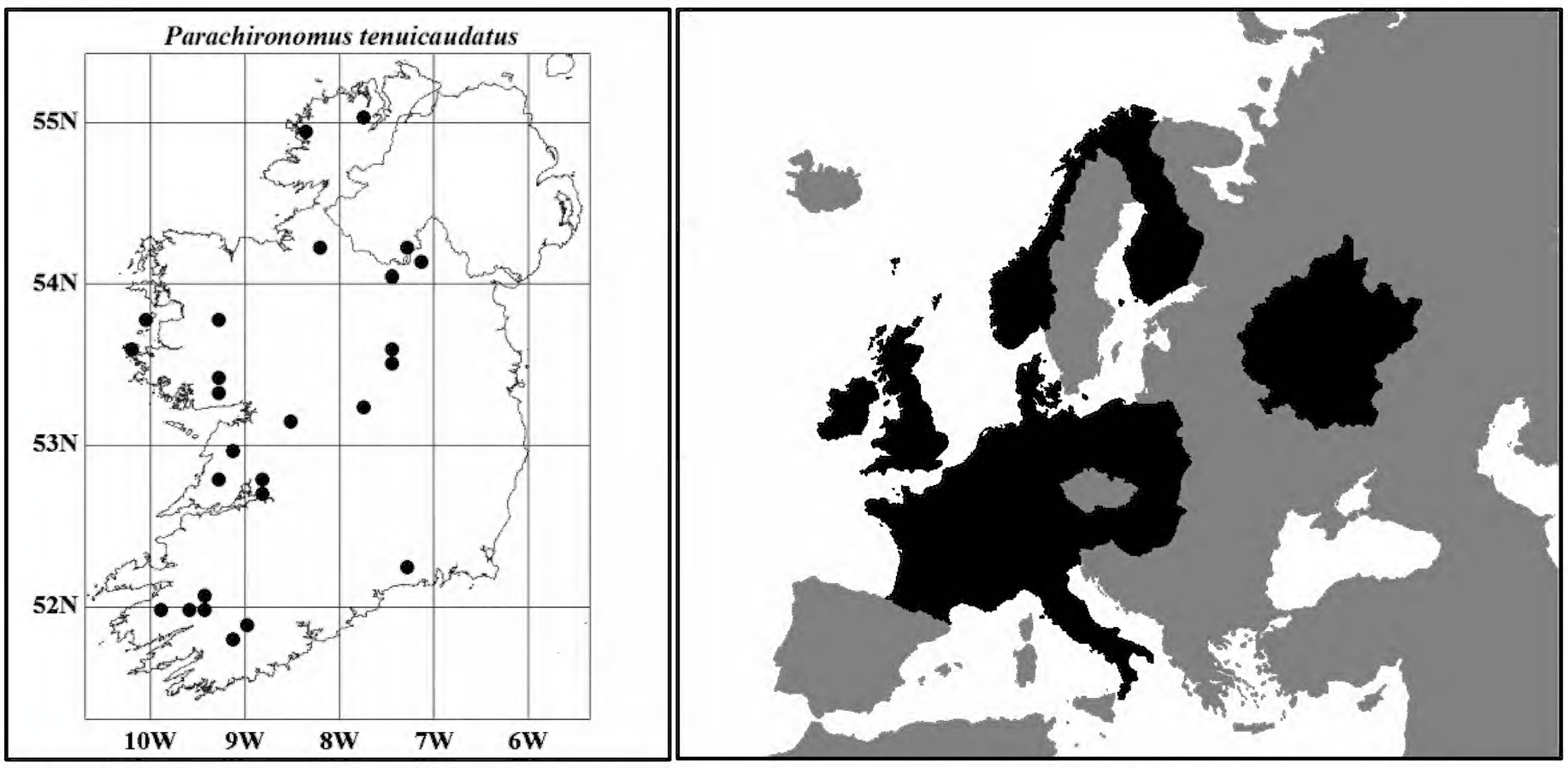
FIGURES 771-772. *Parachironomus monochromus* (van der Wulp, 1875).



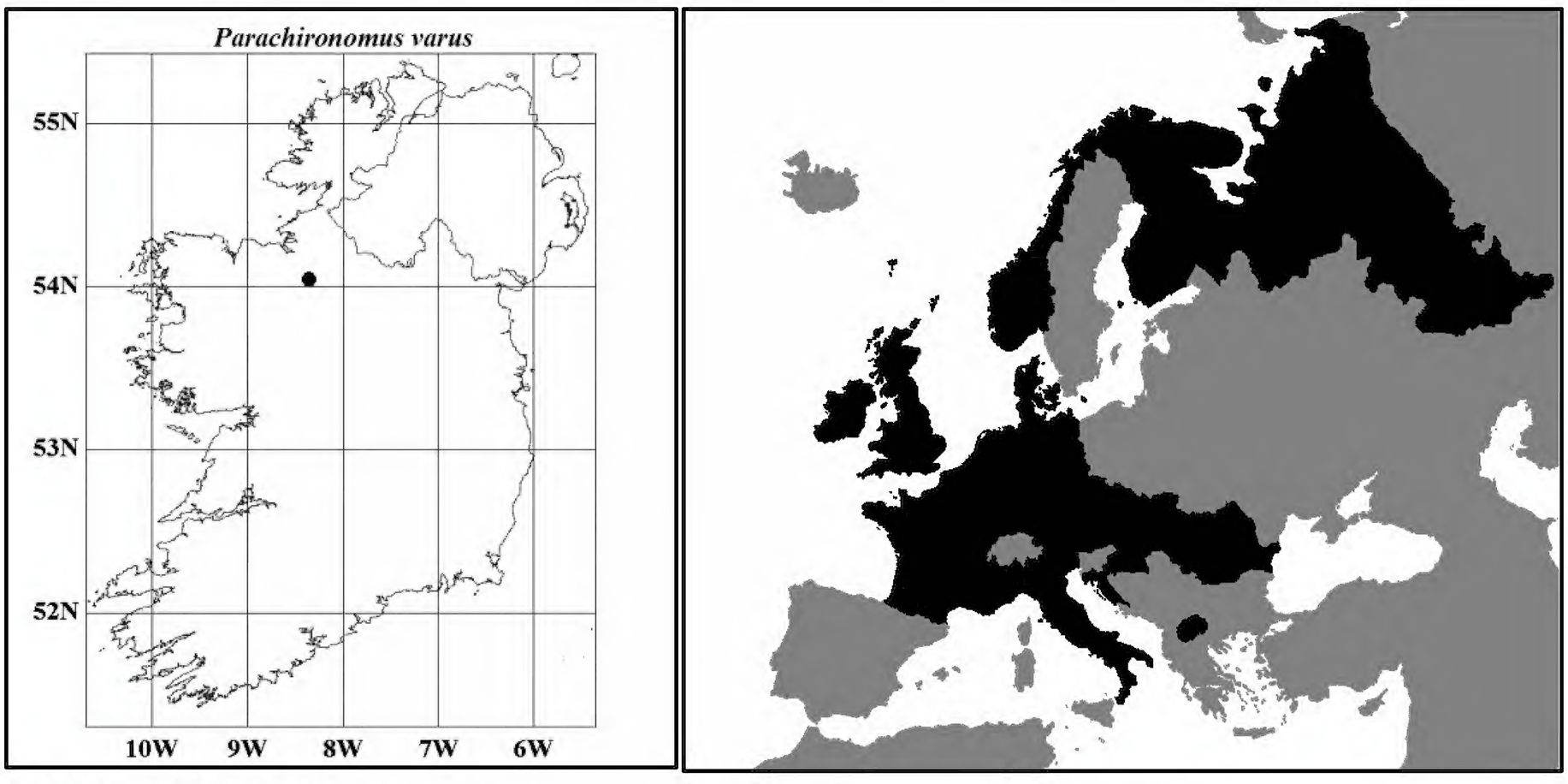
FIGURES 773-774. *Parachironomus parilis* (Walker, 1856).



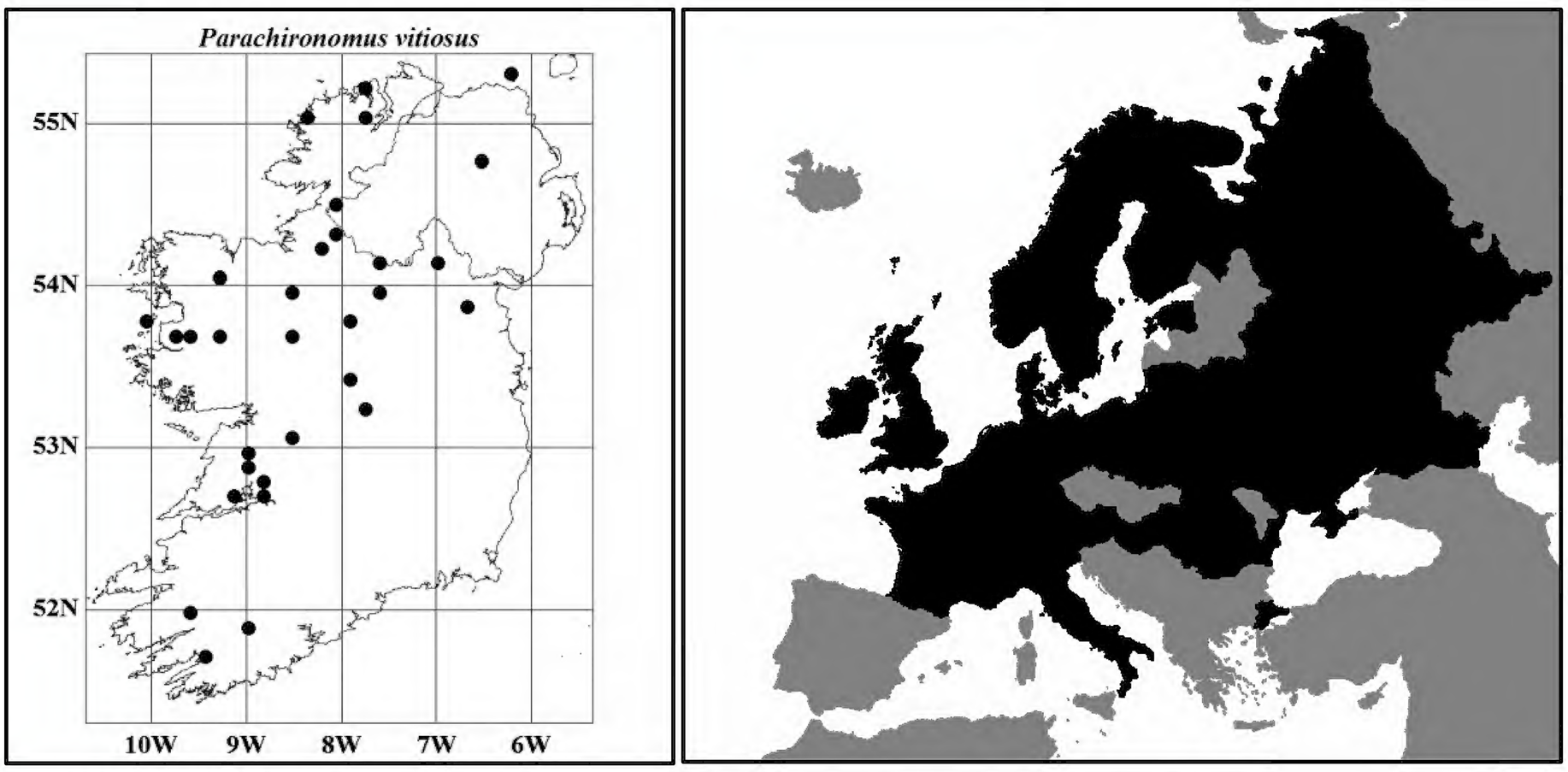
FIGURES 775-776. *Parachironomus subalpinus* (Goetghebuer, 1932).



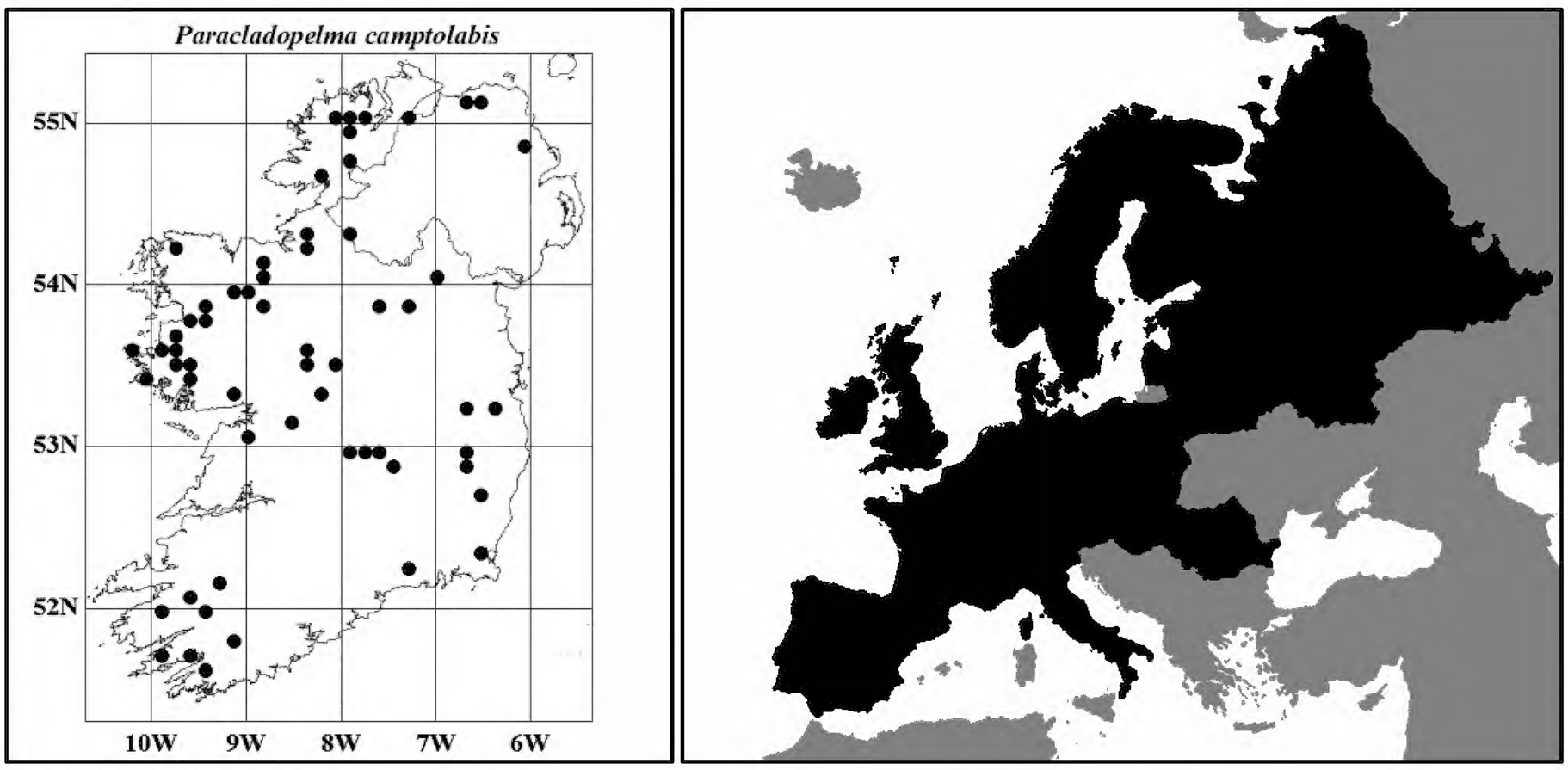
FIGURES 777-778. *Parachironomus tenuicaudatus* (Malloch, 1915).



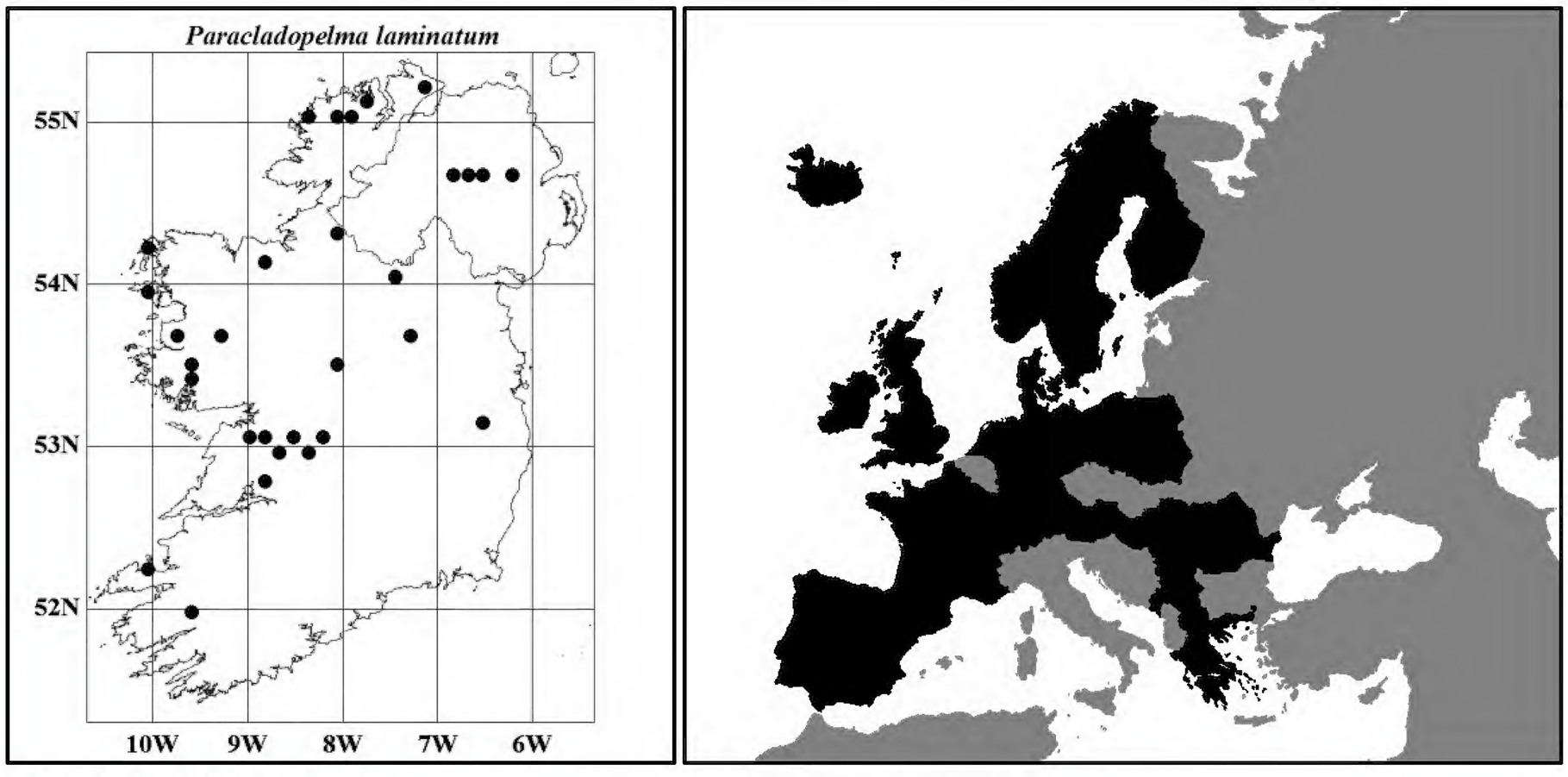
FIGURES 779-780. *Parachironomus varus* (Goetghebuer, 1921).



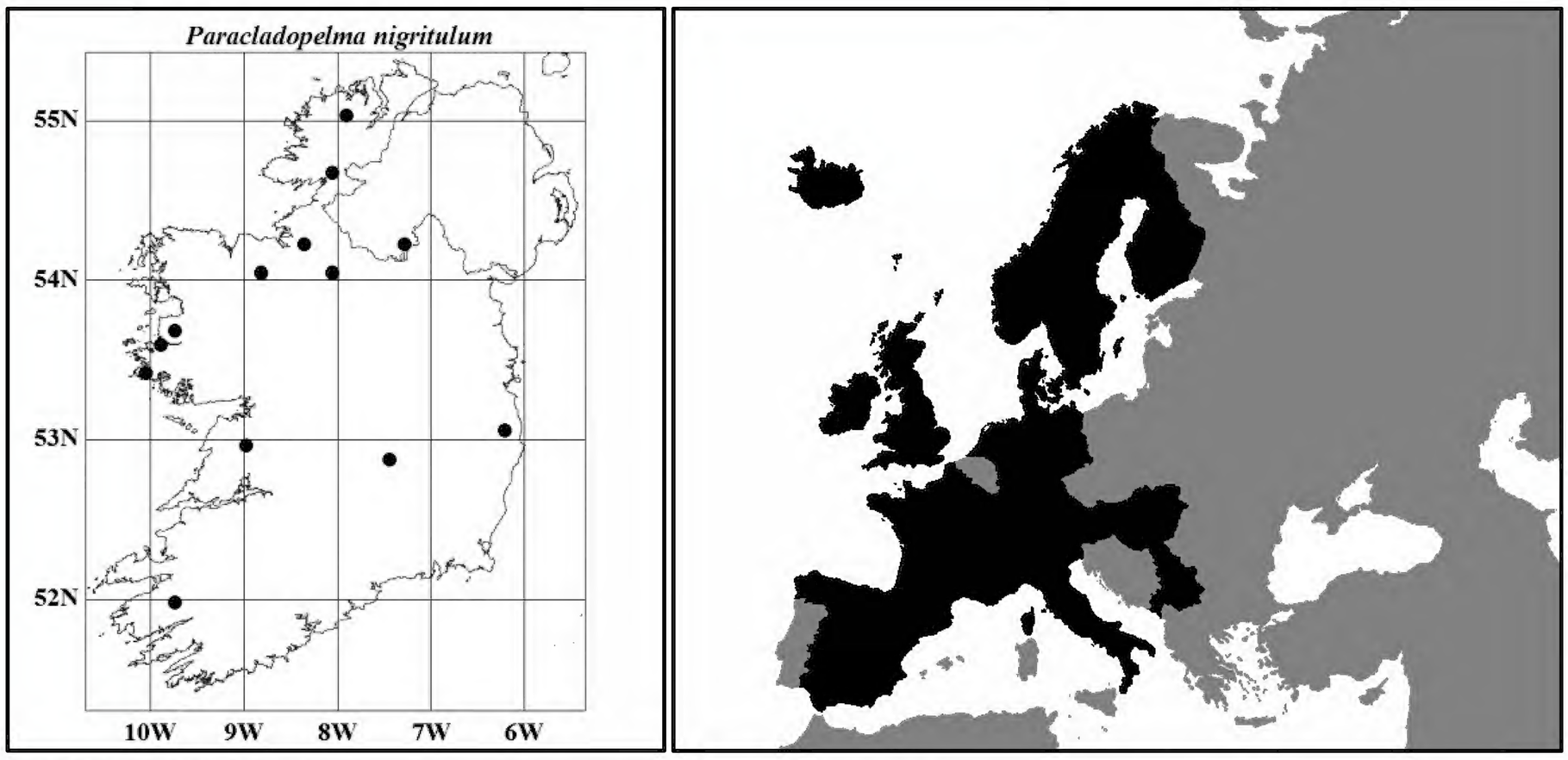
FIGURES 781-782. *Parachironomus vitiosus* (Goetghebuer, 1921).



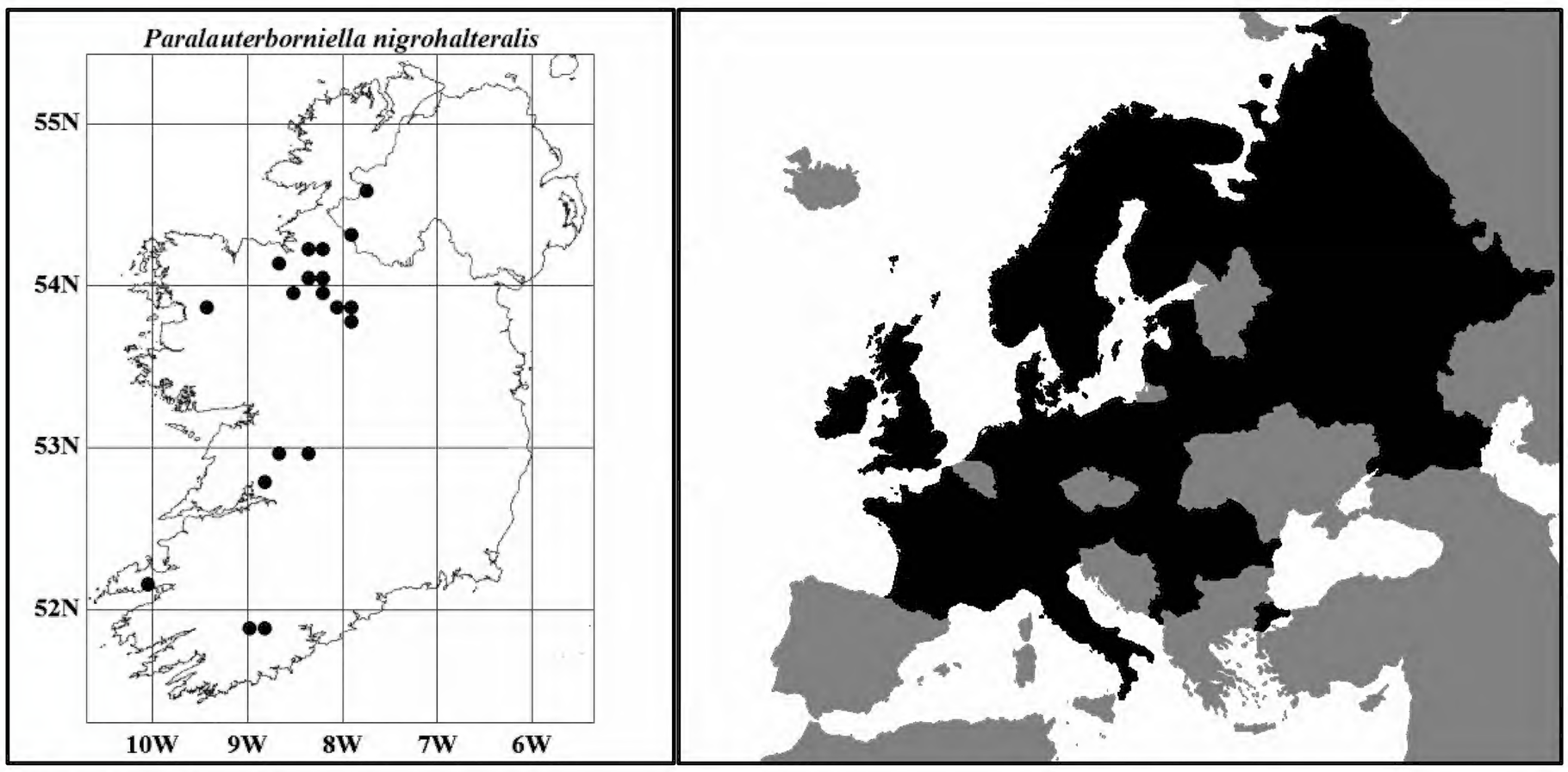
FIGURES 783-784. *Paracladopelma camptolabis* (Kieffer, 1913).



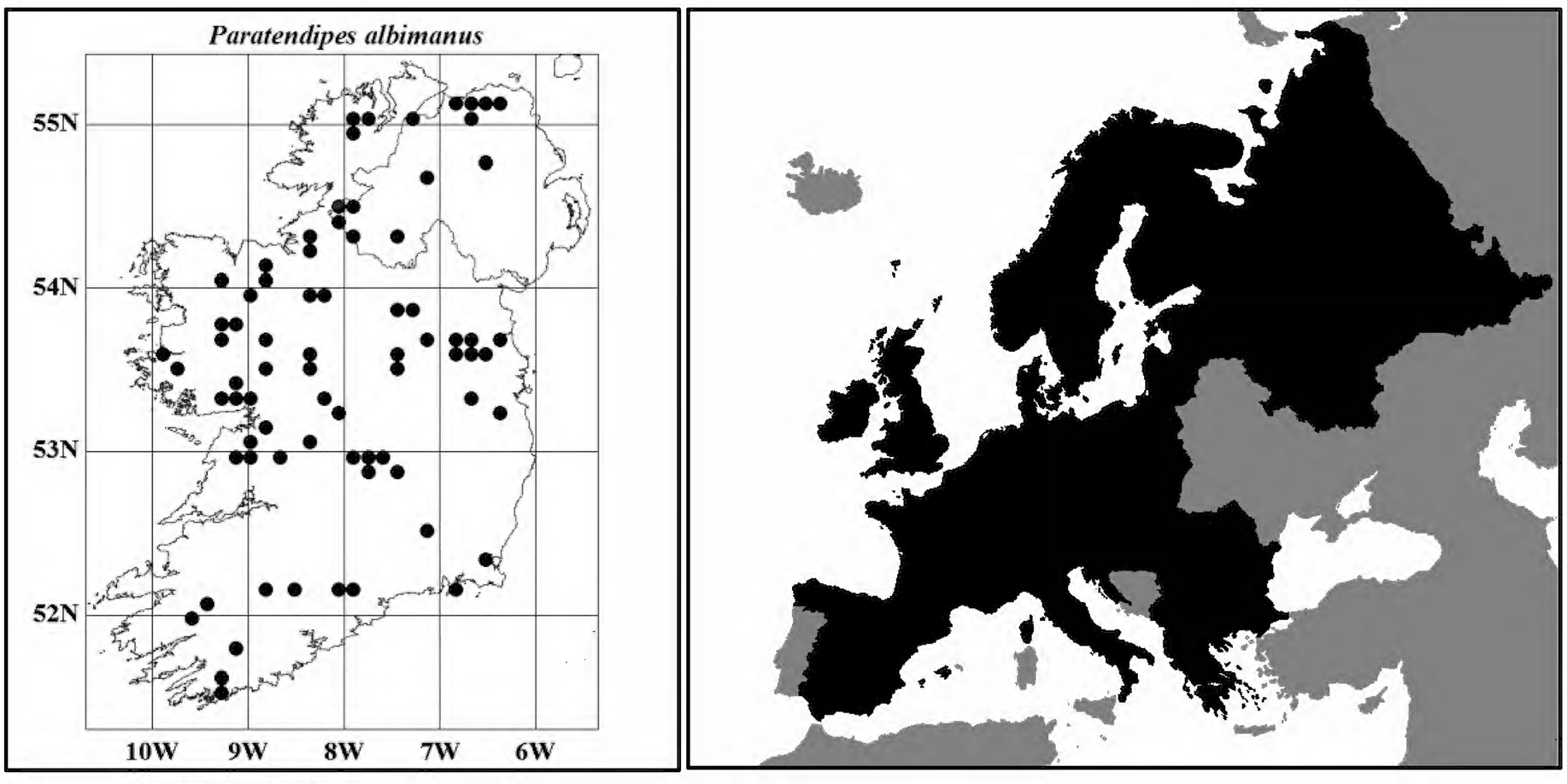
FIGURES 785-786. *Paracladopelma laminatum* (Kieffer, 1921).



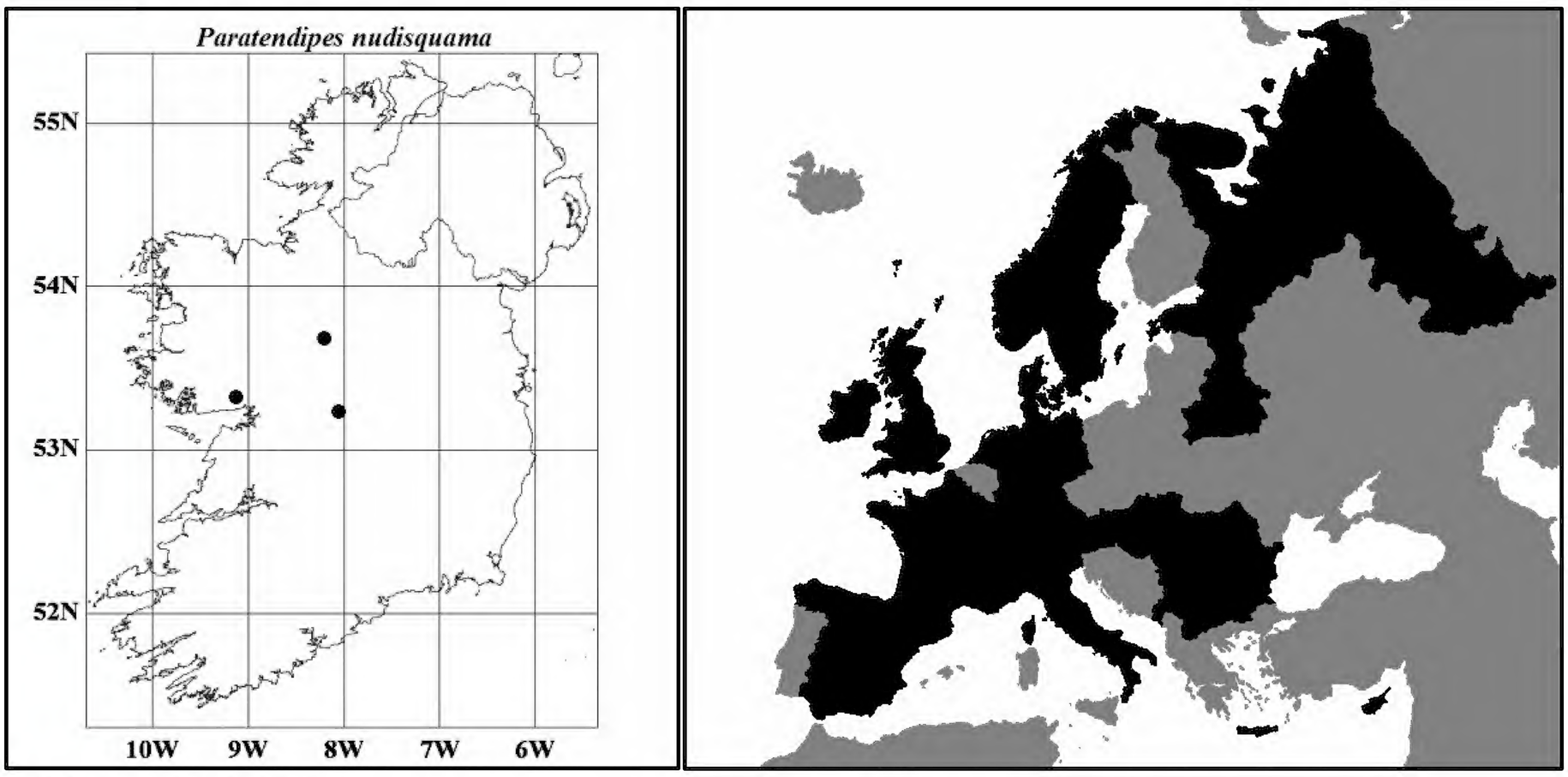
FIGURES 787-788. *Paracladopelma nigritulum* (Goetghebuer, 1942).



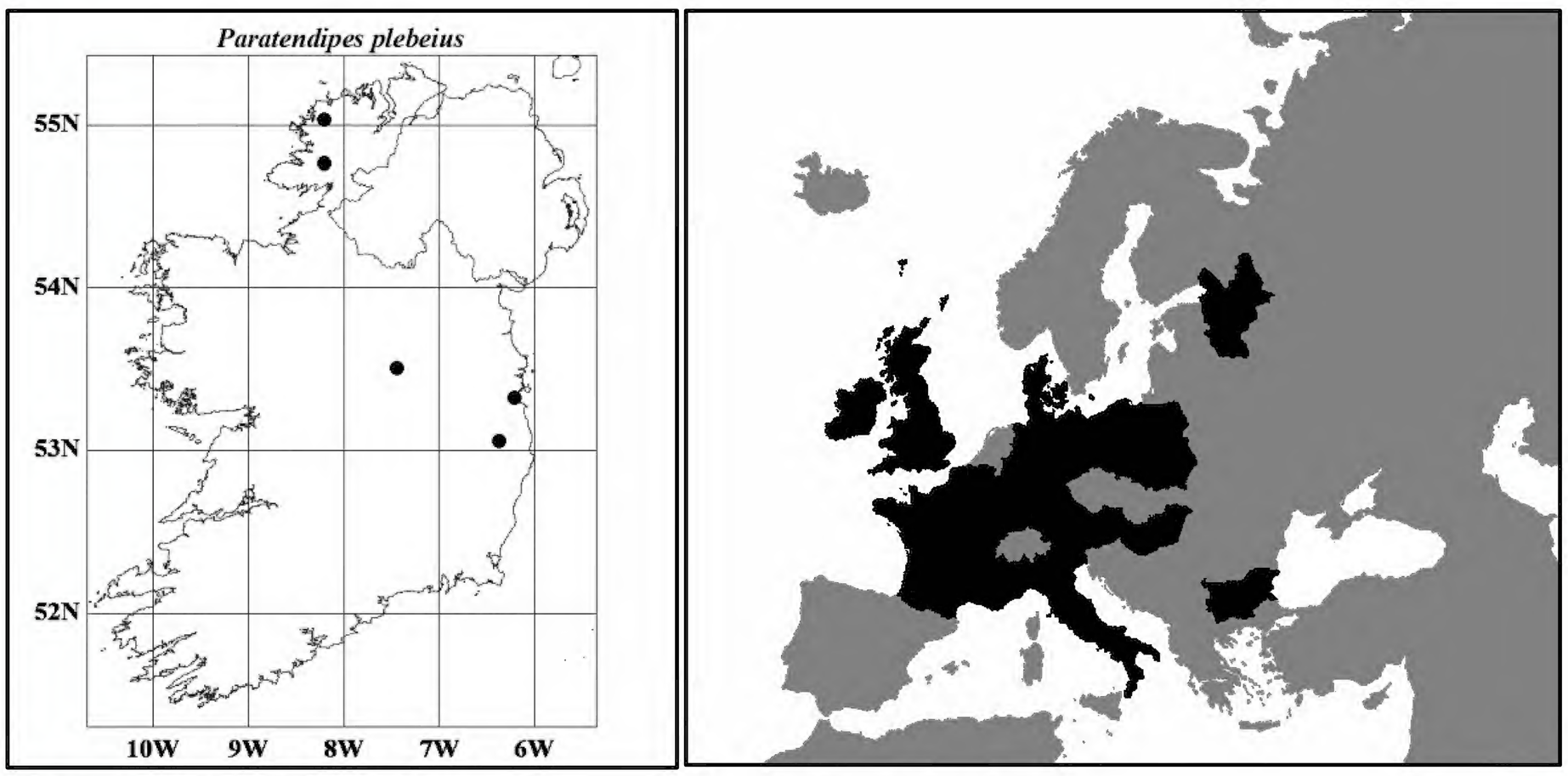
FIGURES 789-790. *Paralauterborniella nigrohalteralis* (Malloch, 1915).



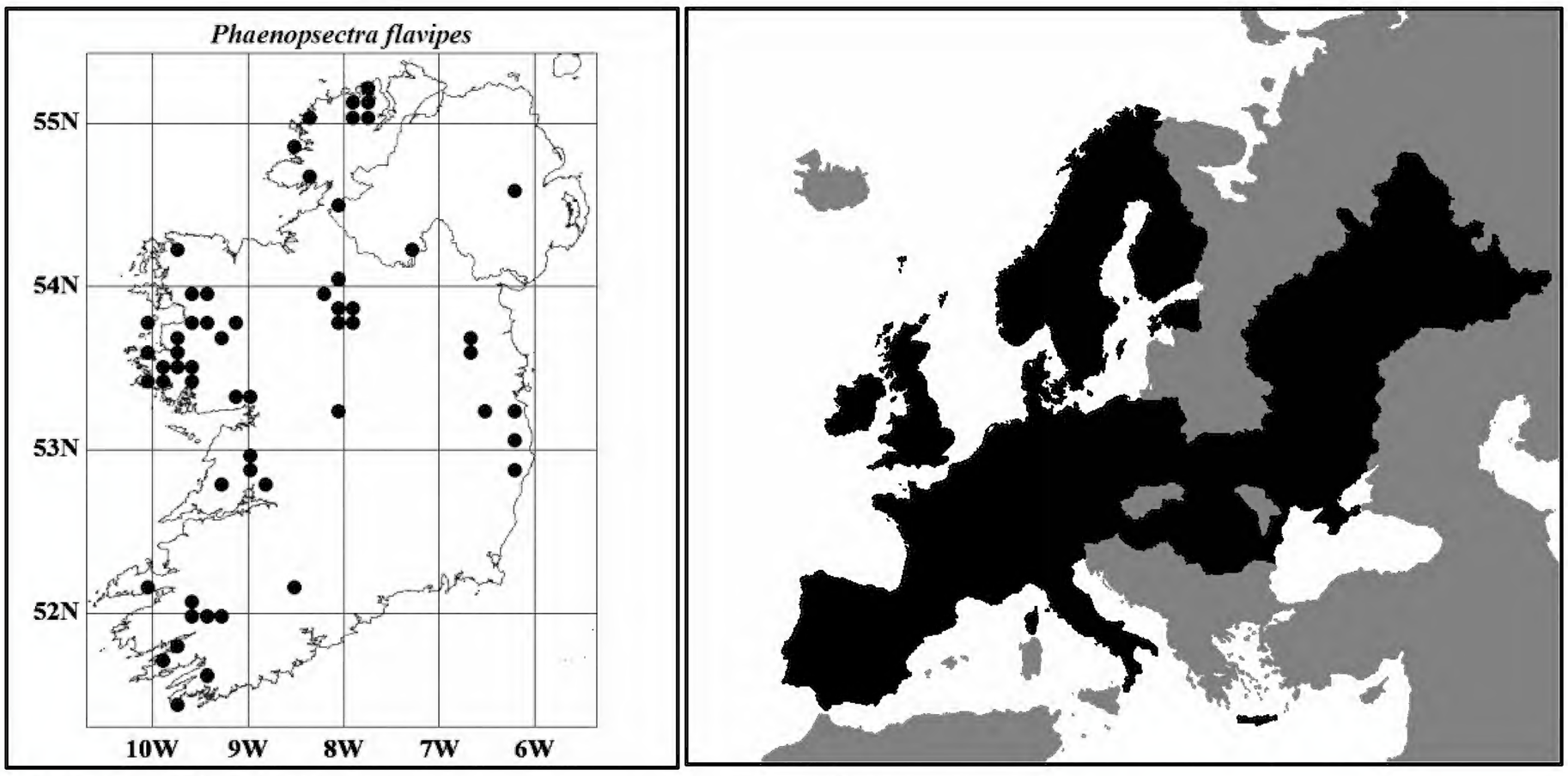
FIGURES 791-792. *Paratendipes albimanus* (Meigen, 1818).



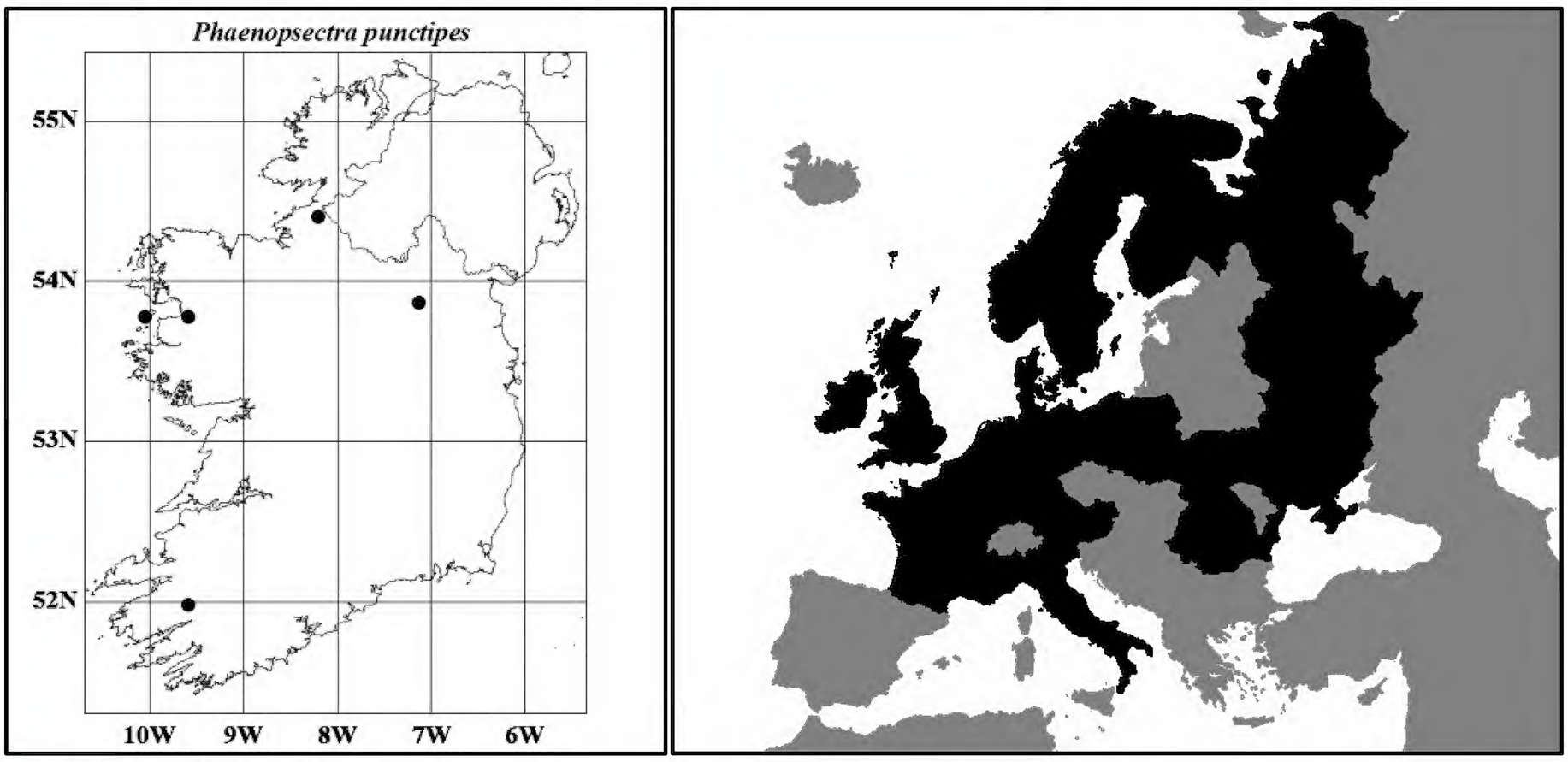
FIGURES 793-794. *Paratendipes nudisquama* (Edwards, 1929).



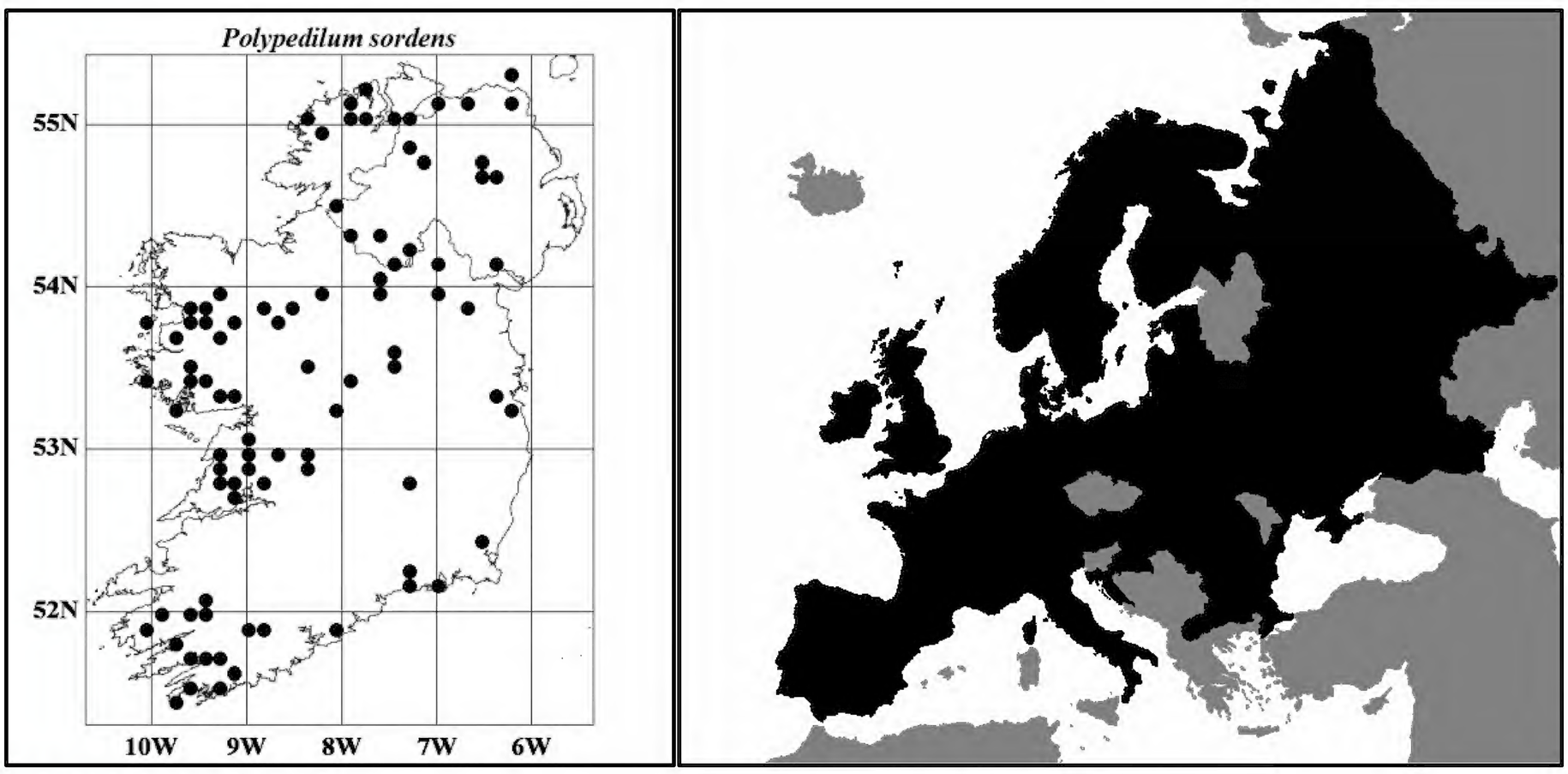
FIGURES 795-796. *Paratendipes plebeius* (Meigen, 1818).



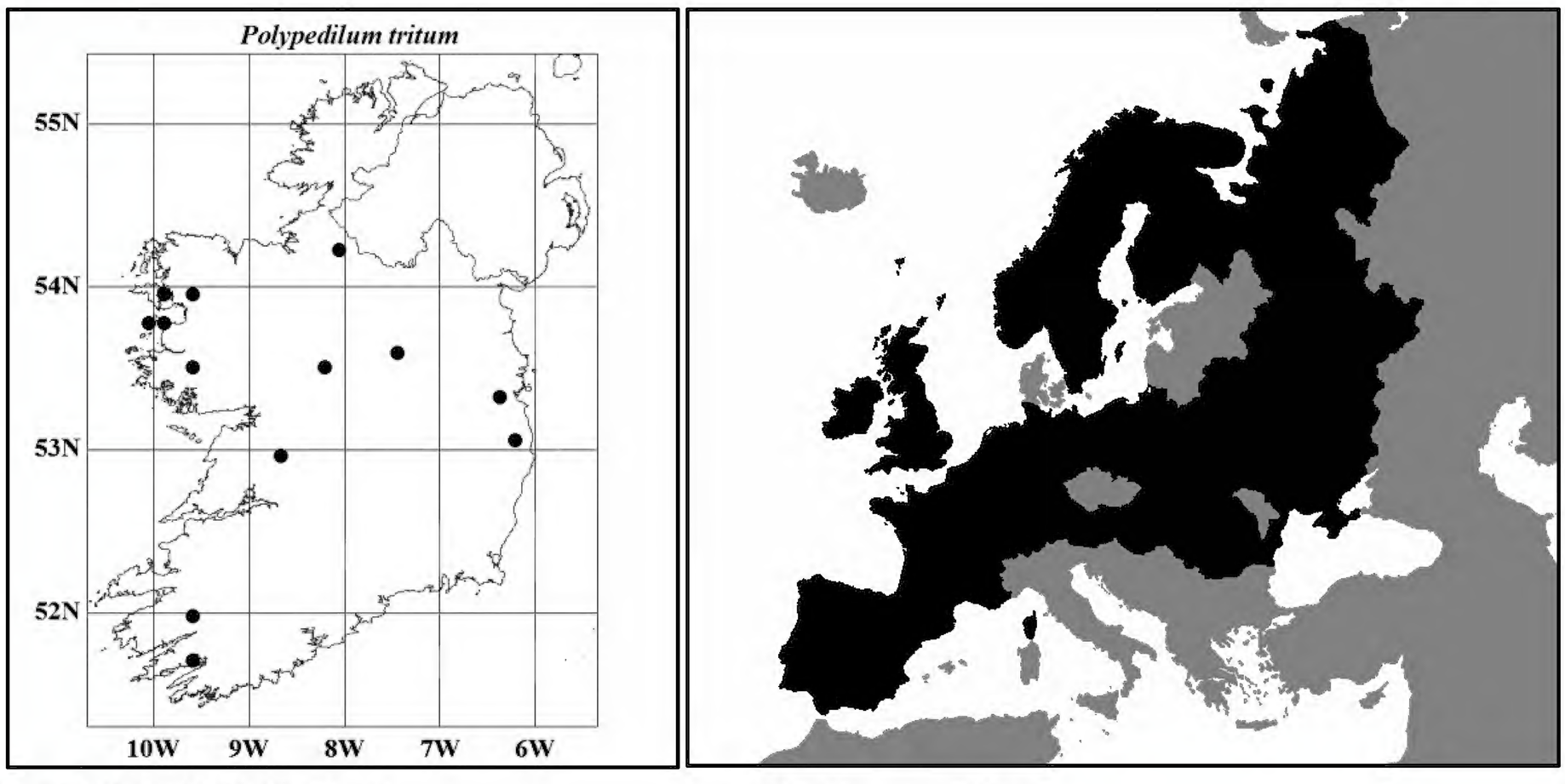
FIGURES 797-798. *Phaenopsectra flavipes* (Meigen, 1818).



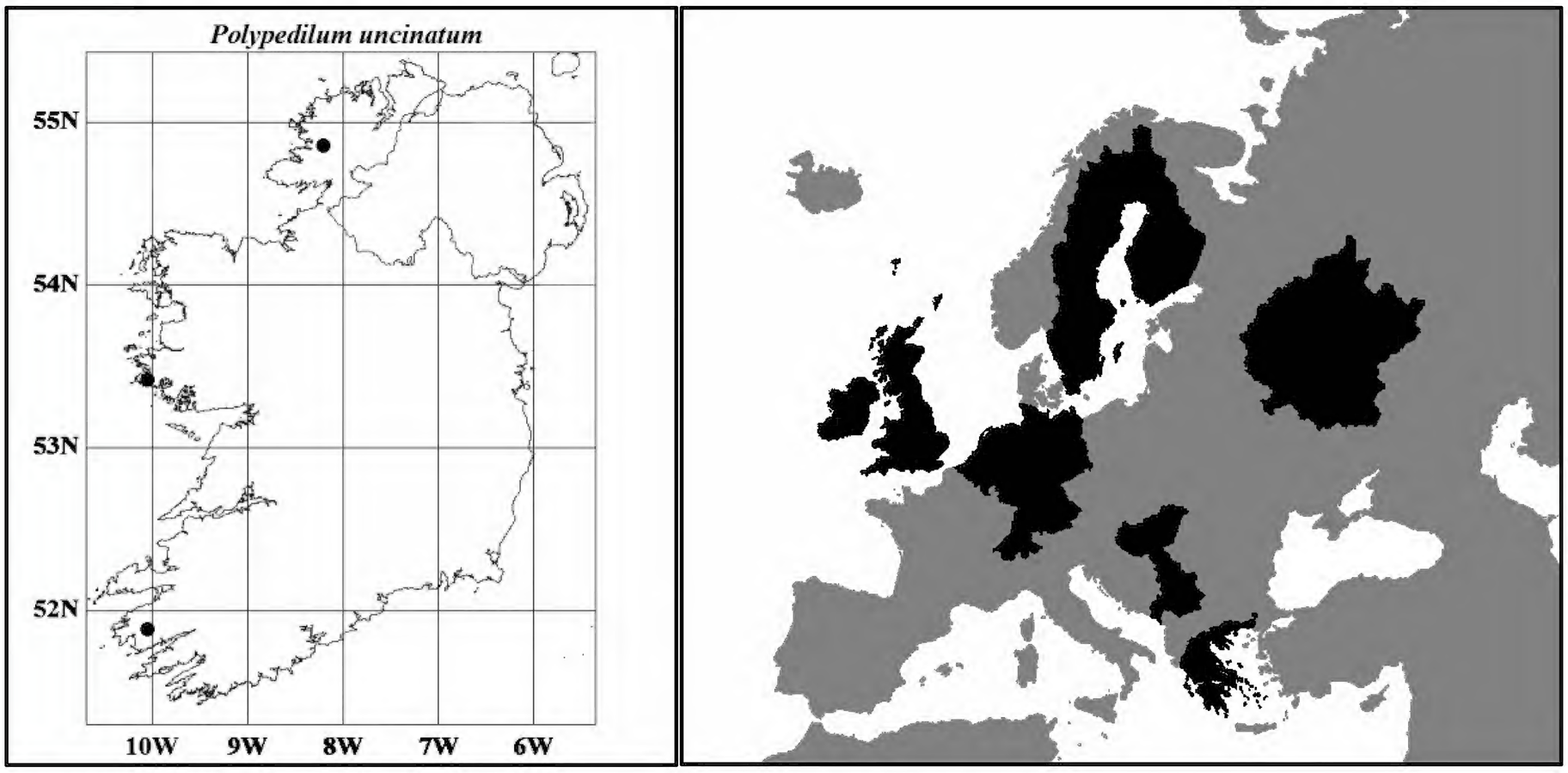
FIGURES 799-800. *Phaenopsectra punctipes* (Wiedemann, 1817).



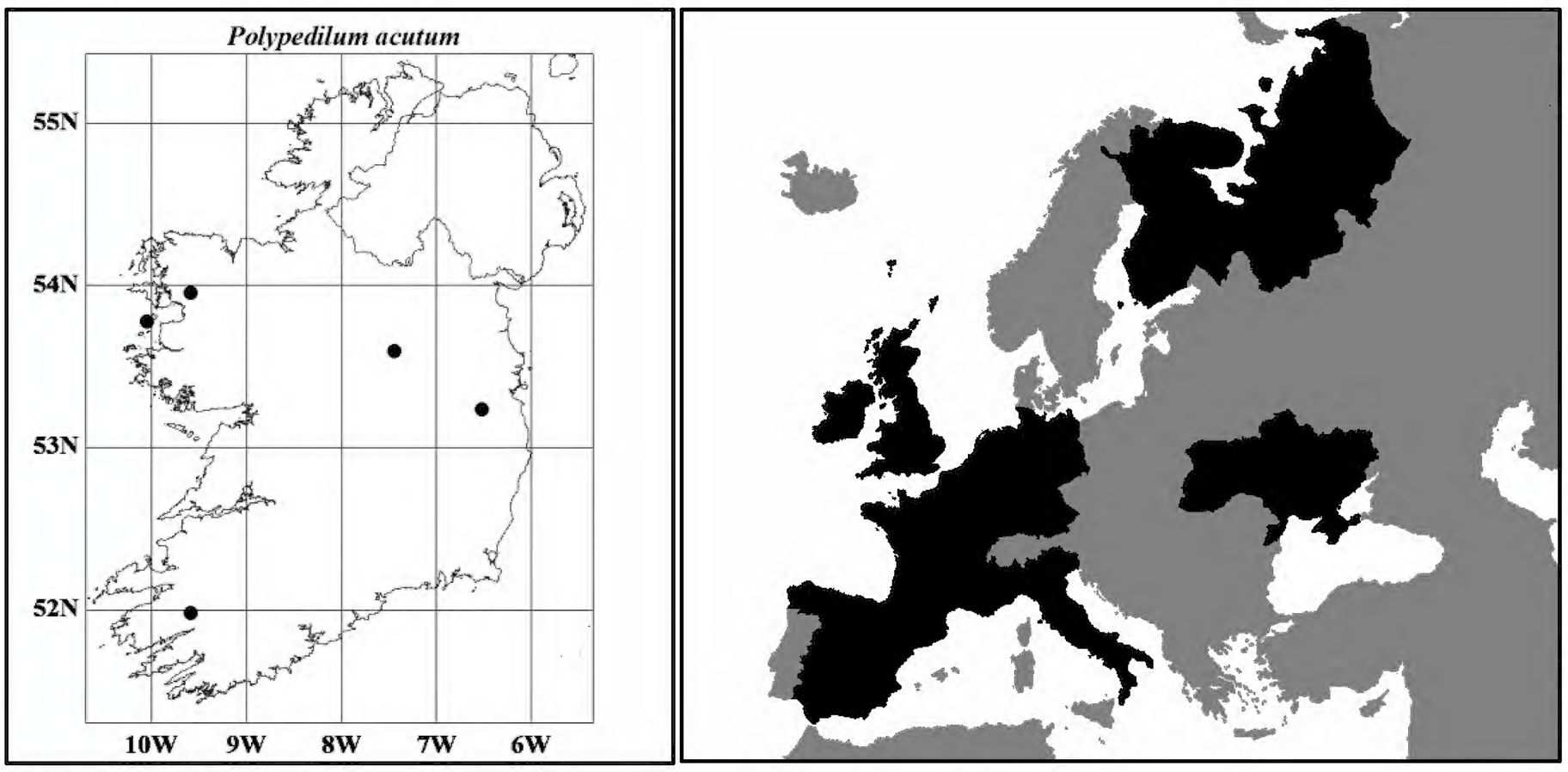
FIGURES 801-802. *Polypedilum sordens* (van der Wulp, 1875).



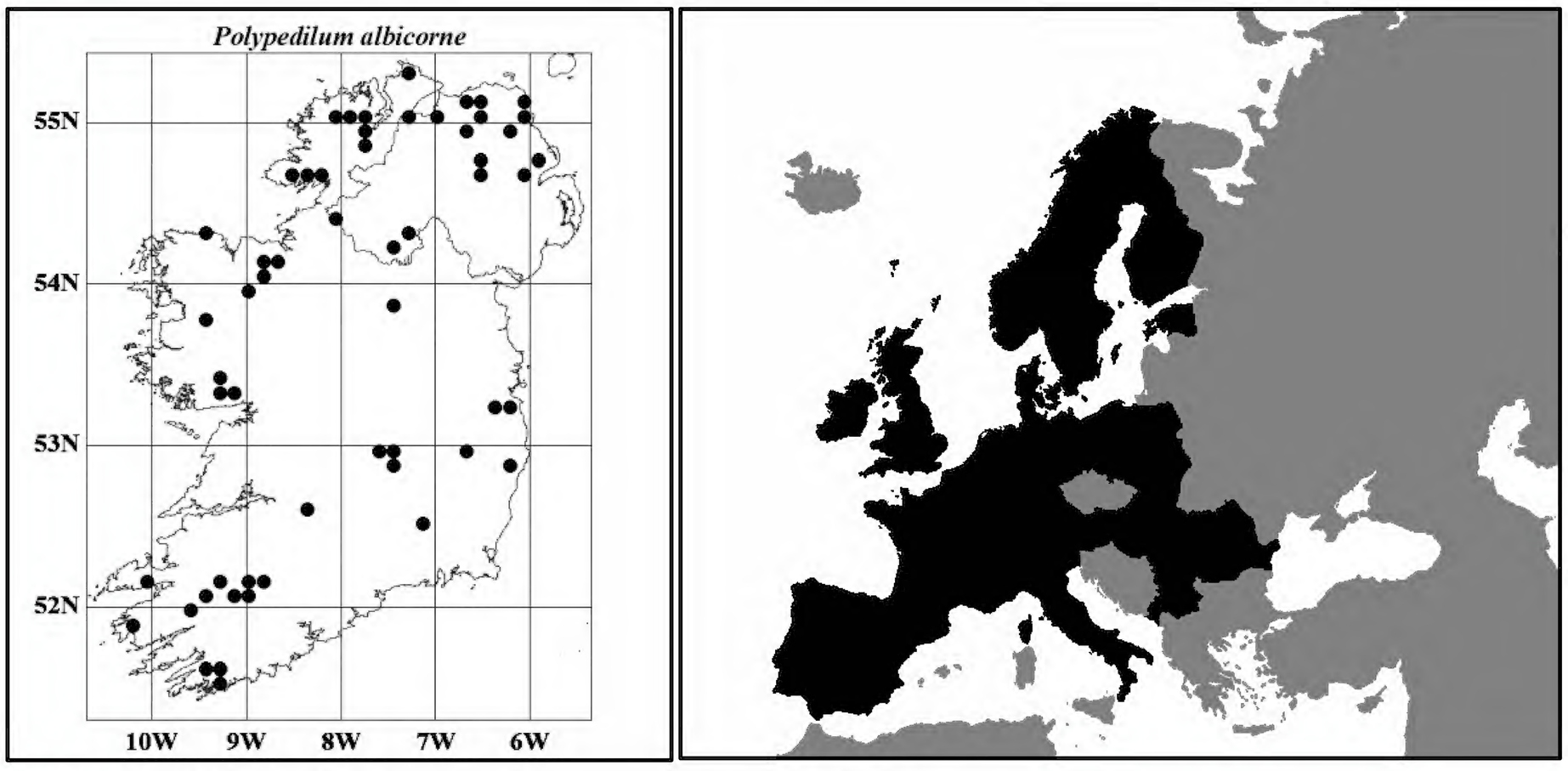
FIGURES 803-804. *Polypedilum tritum* (Walker, 1856).



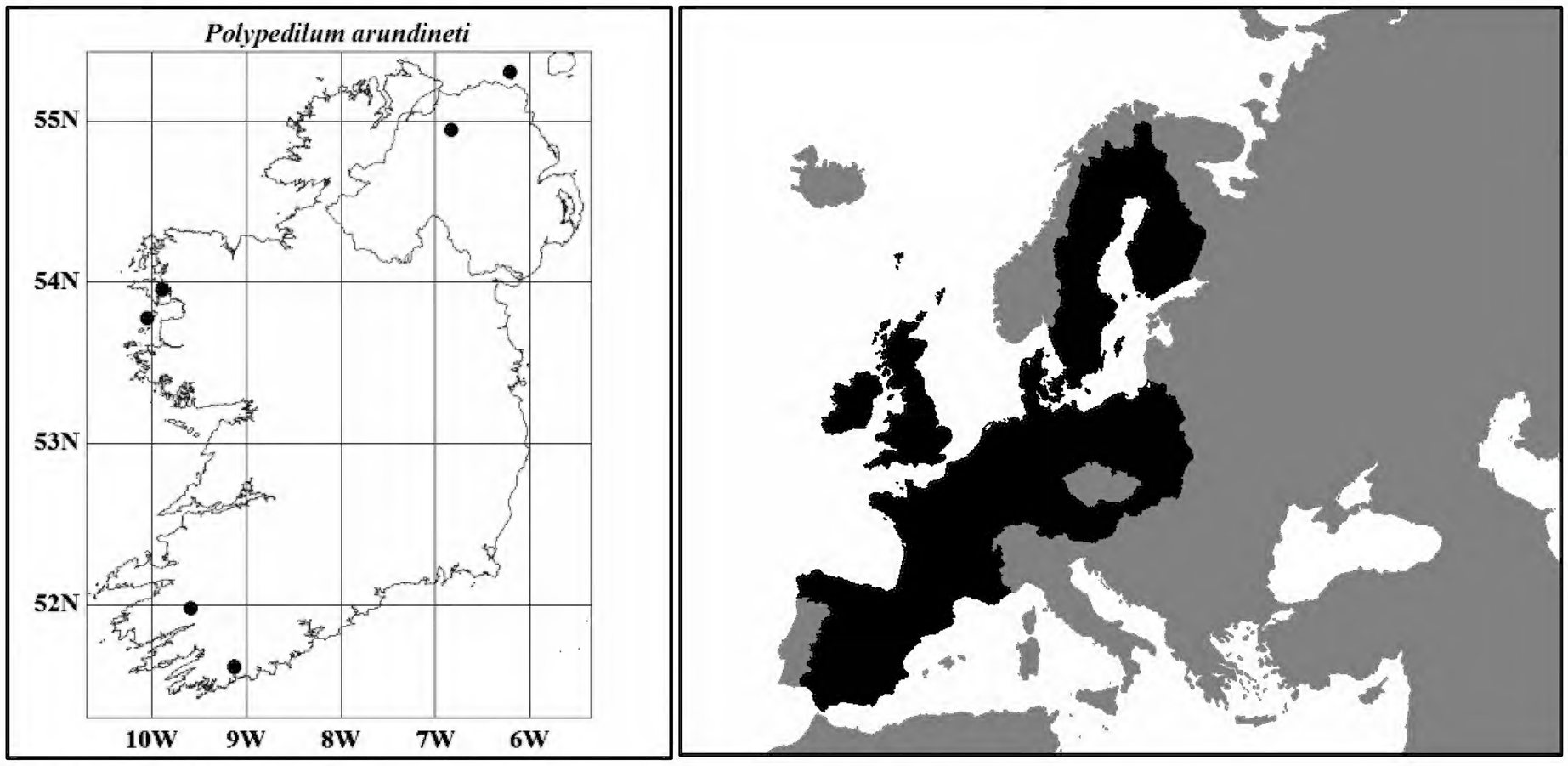
FIGURES 805-806. *Polypedilum uncinatum* (Goetghebuer, 1921).



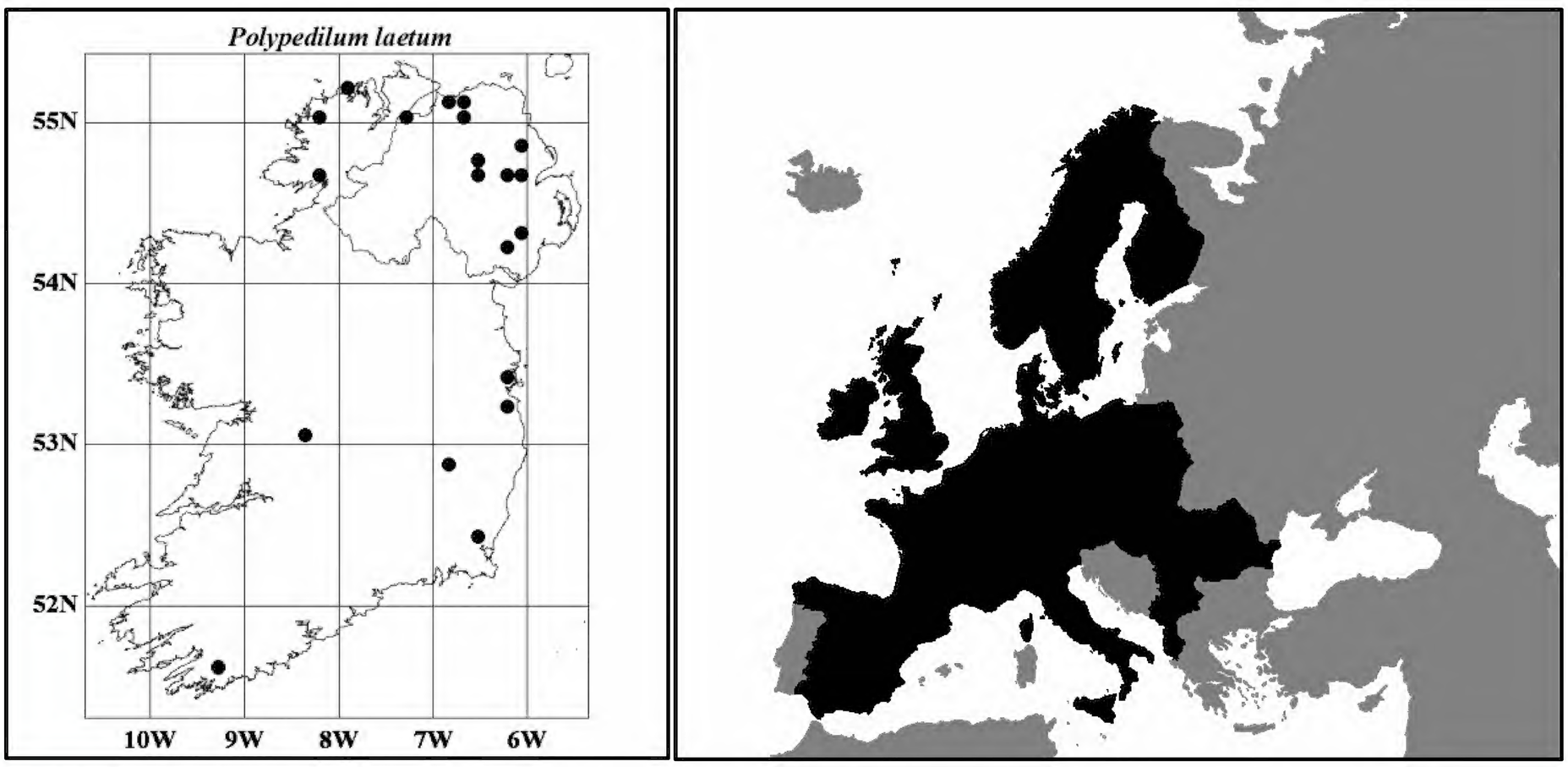
FIGURES 807-808. *Polypedilum acutum* Kieffer, 1915.



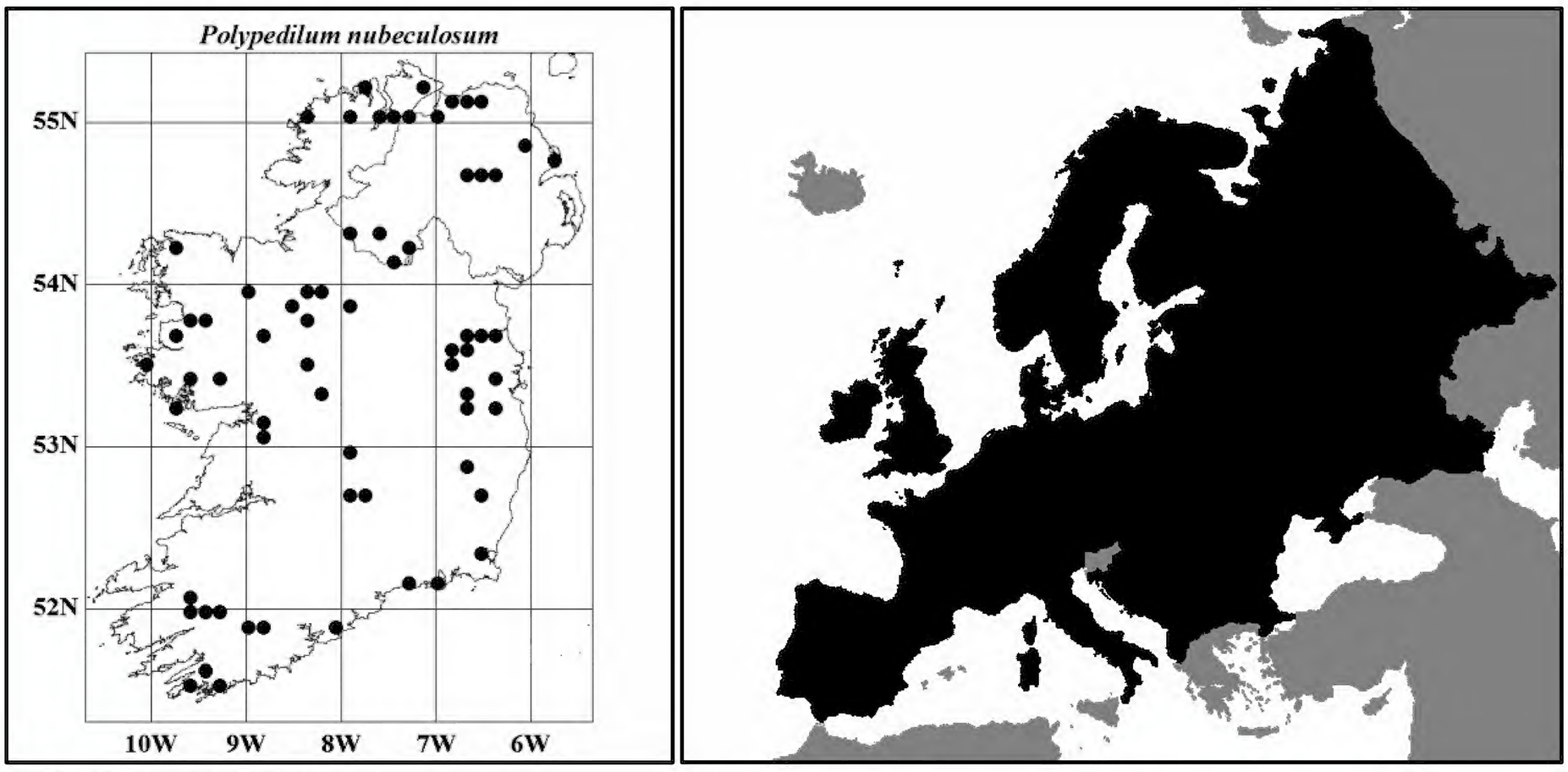
FIGURES 809-810. *Polypedilum albicorne* (Meigen, 1838).



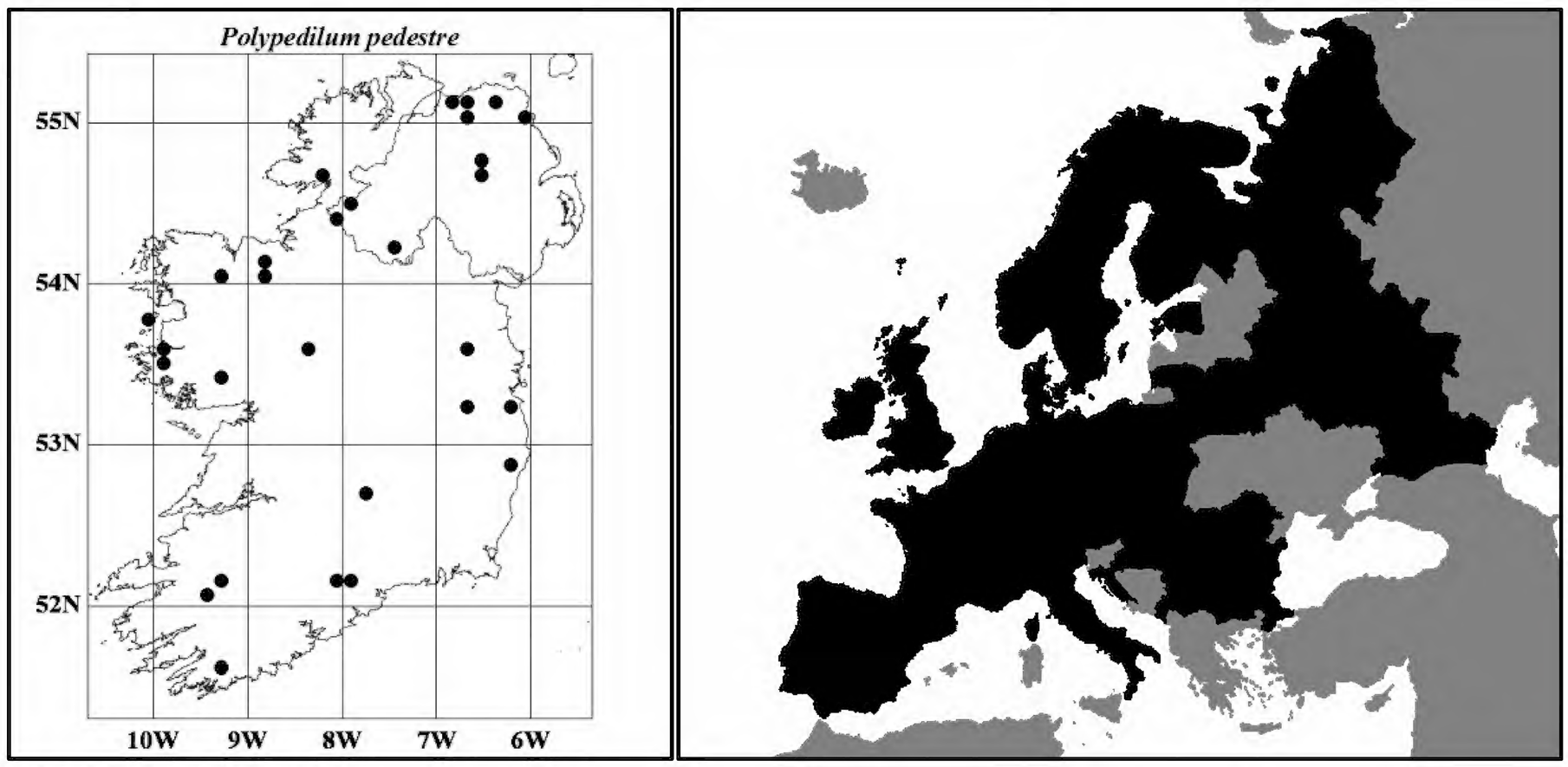
FIGURES 811-812. *Polypedilum arundineti* (Goetghebuer, 1921).



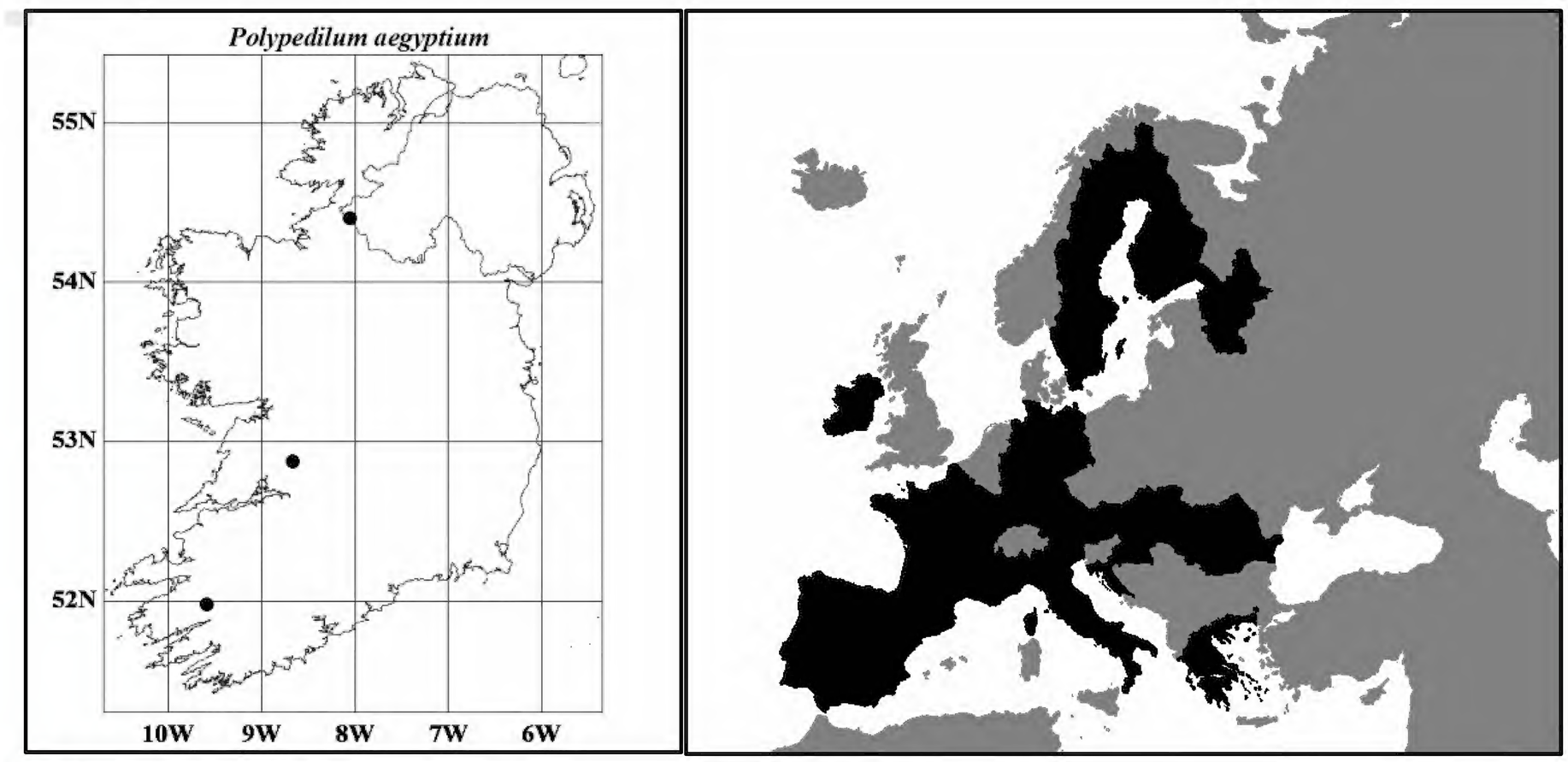
FIGURES 813-814. *Polypedilum laetum* (Meigen, 1818).



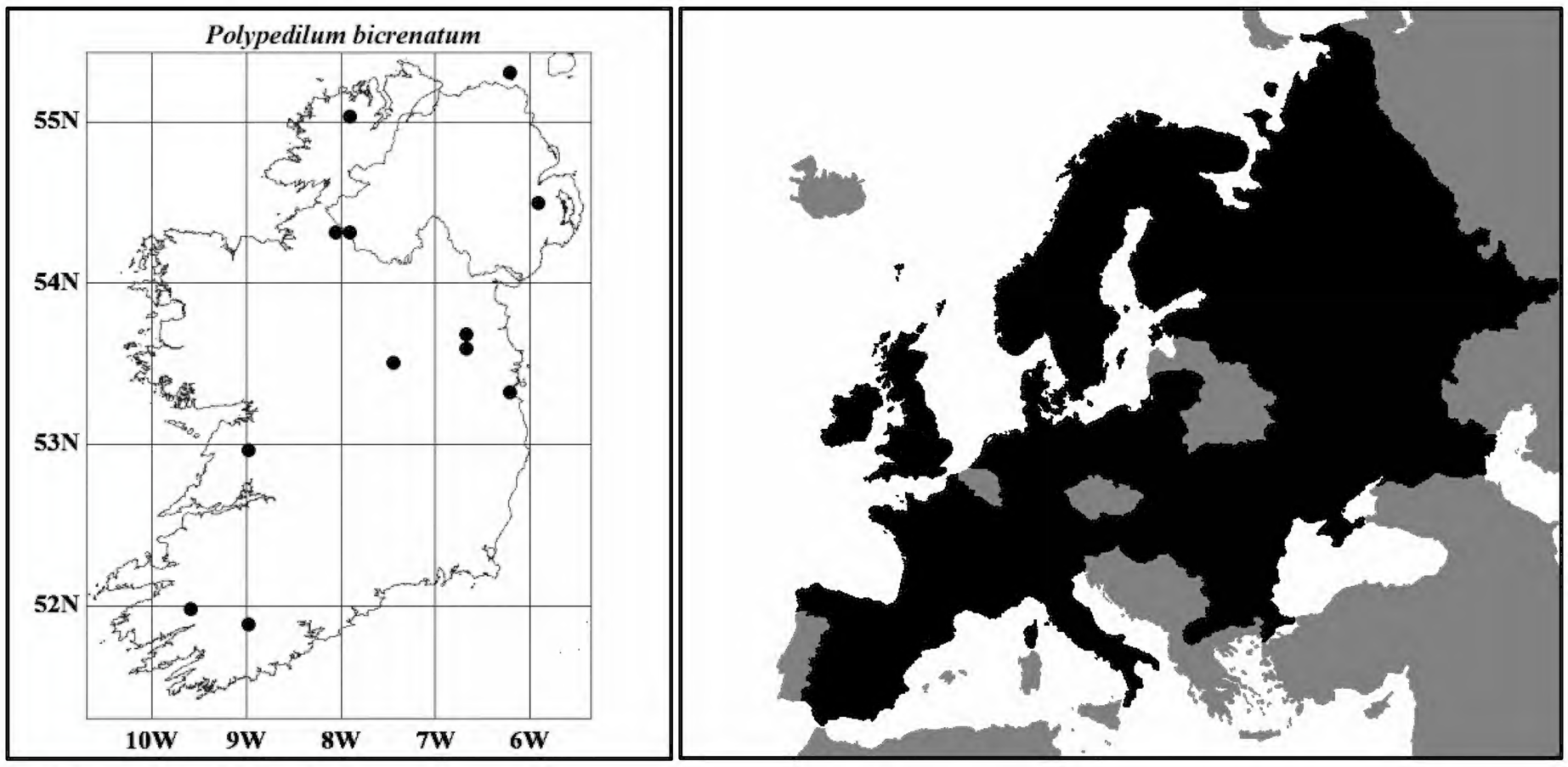
FIGURES 815-816. *Polypedilum nubeculosum* (Meigen, 1804).



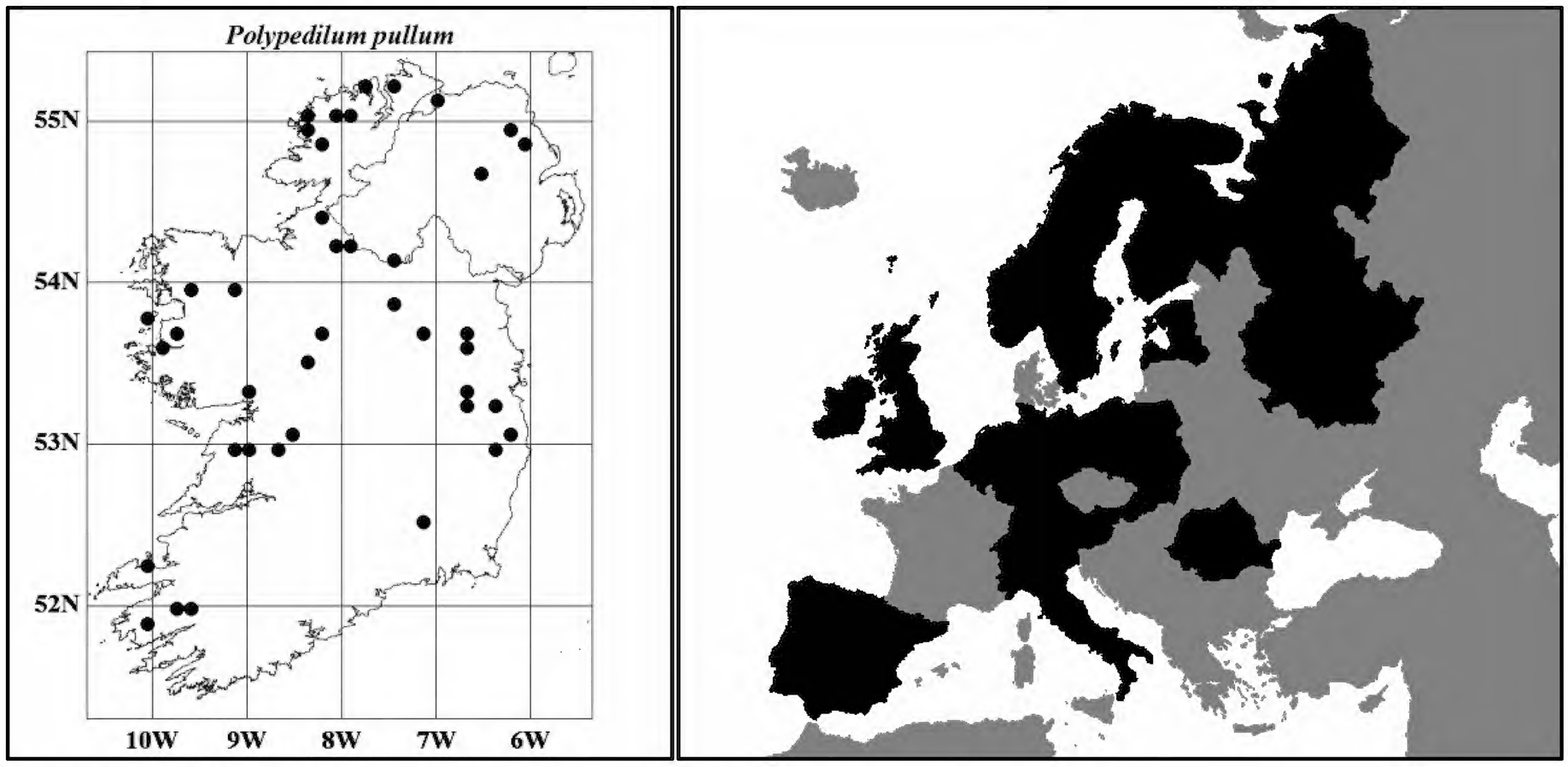
FIGURES 817-818. *Polypedilum pedestre* (Meigen, 1830).



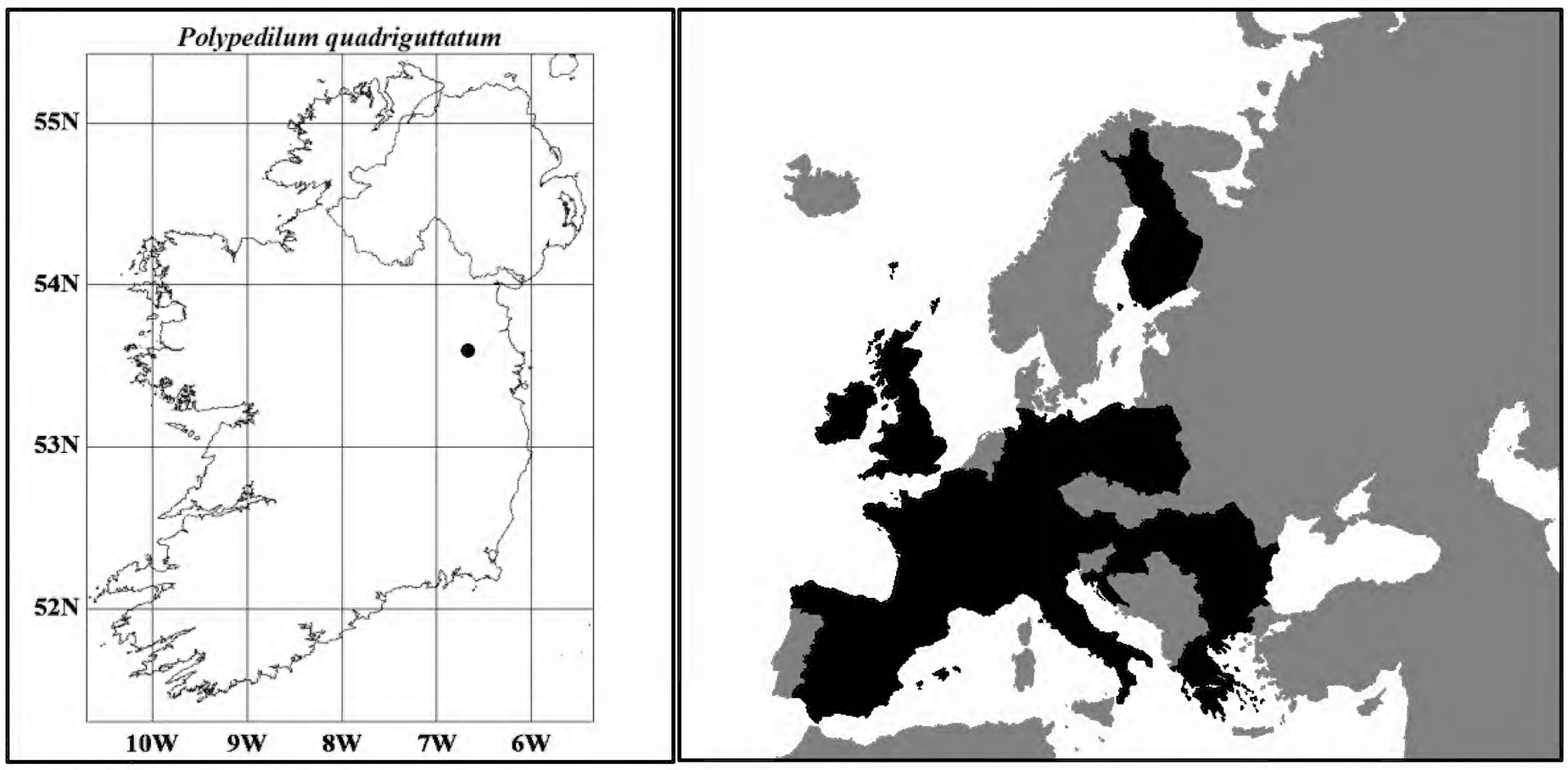
FIGURES 819-820. *Polypedilum aegyptium* Kieffer, 1925.



FIGURES 821-822. *Polypedilum bicrenatum* Kieffer, 1921.

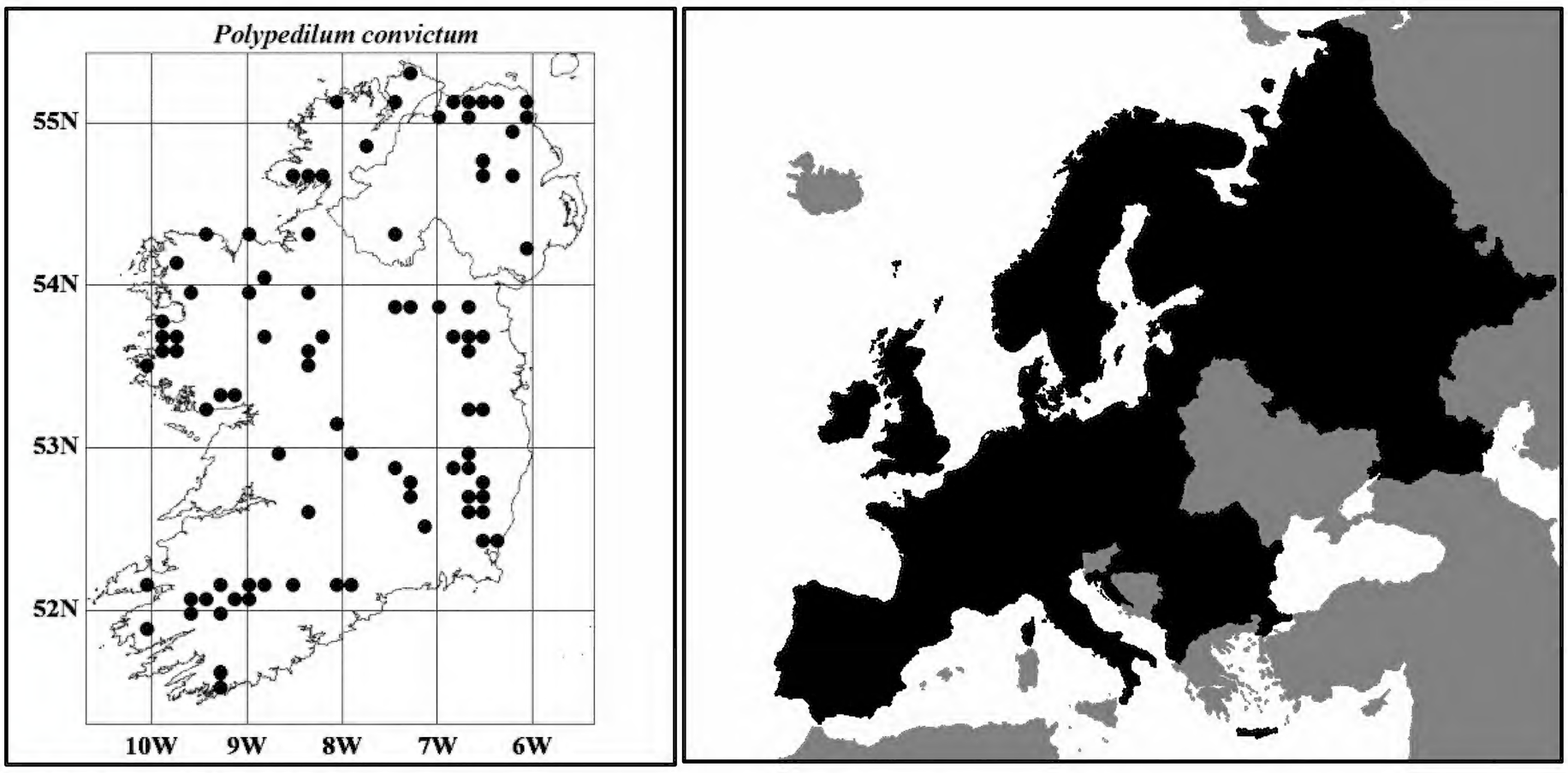


FIGURES 823-824. *Polypedilum pullum* (Zetterstedt, 1838).

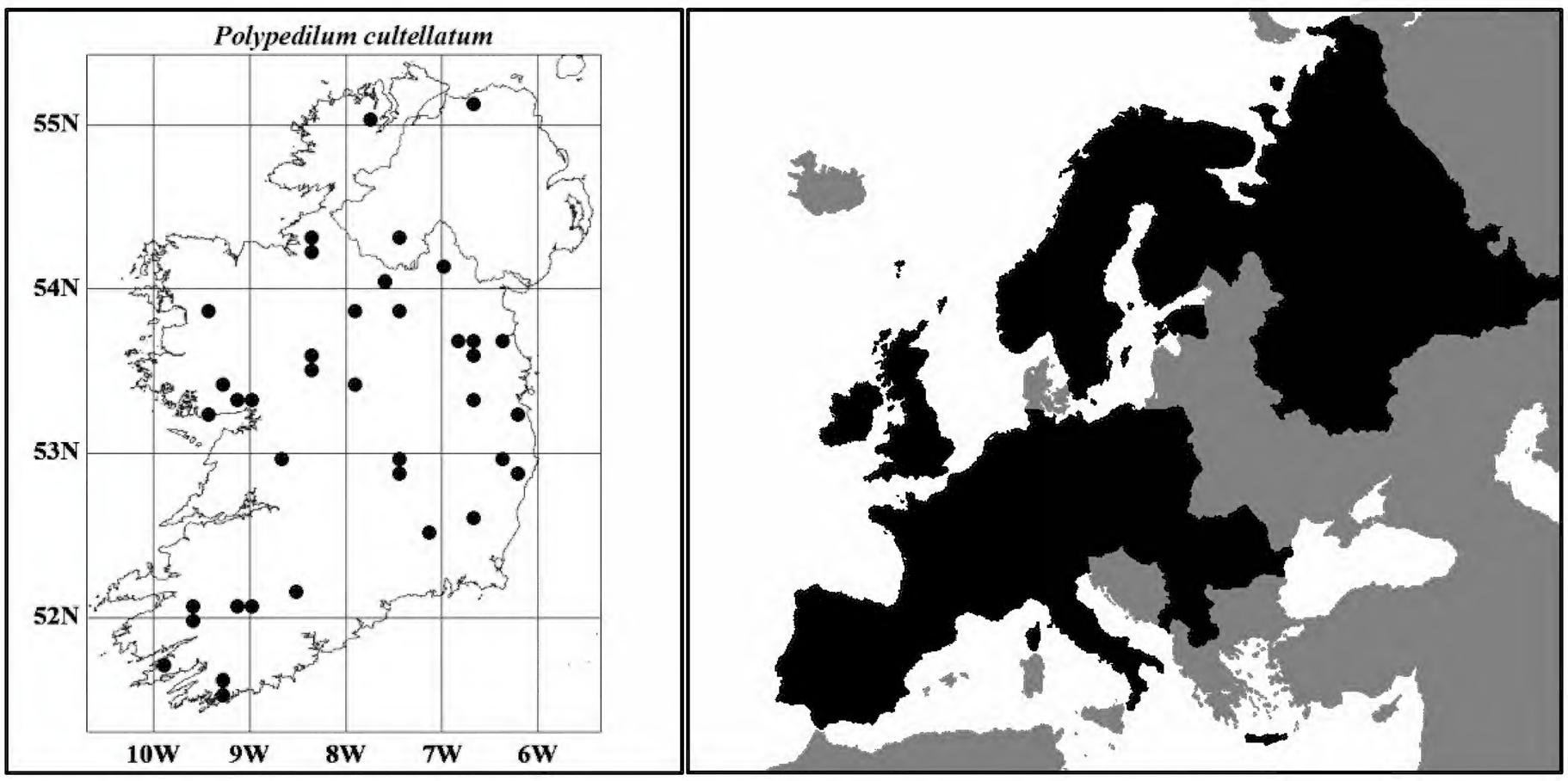


FIGURES 825-826. *Polypedilum quadriguttatum* Kieffer, 1921.

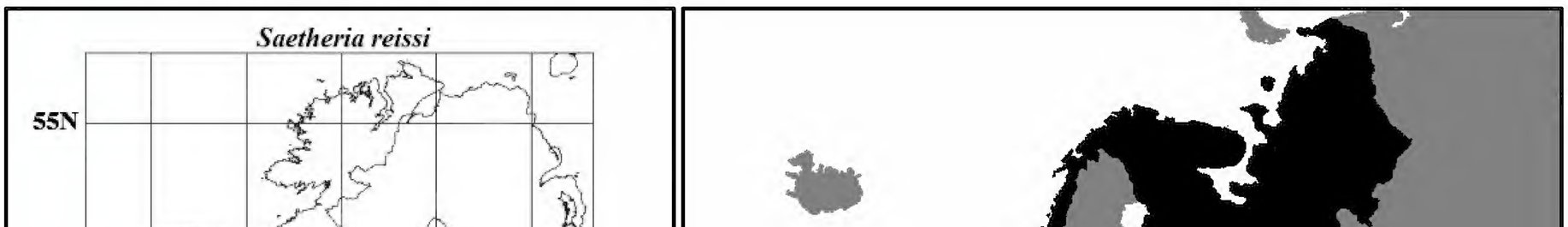
FIGURES 827-828. *Polypedilum scalaenum* (Schrank, 1803).



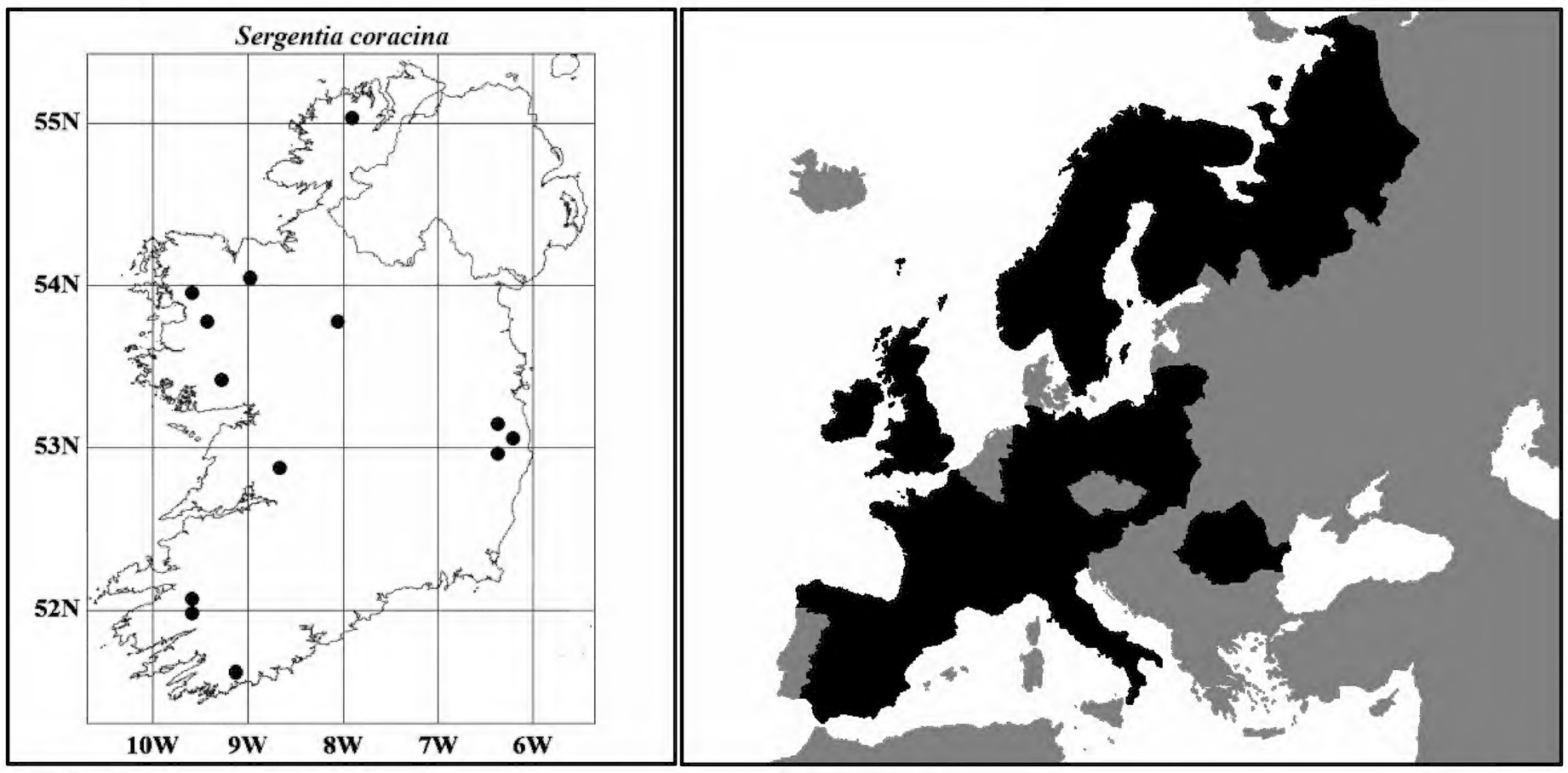
FIGURES 829-830. *Polypedilum convictum* (Walker, 1856).



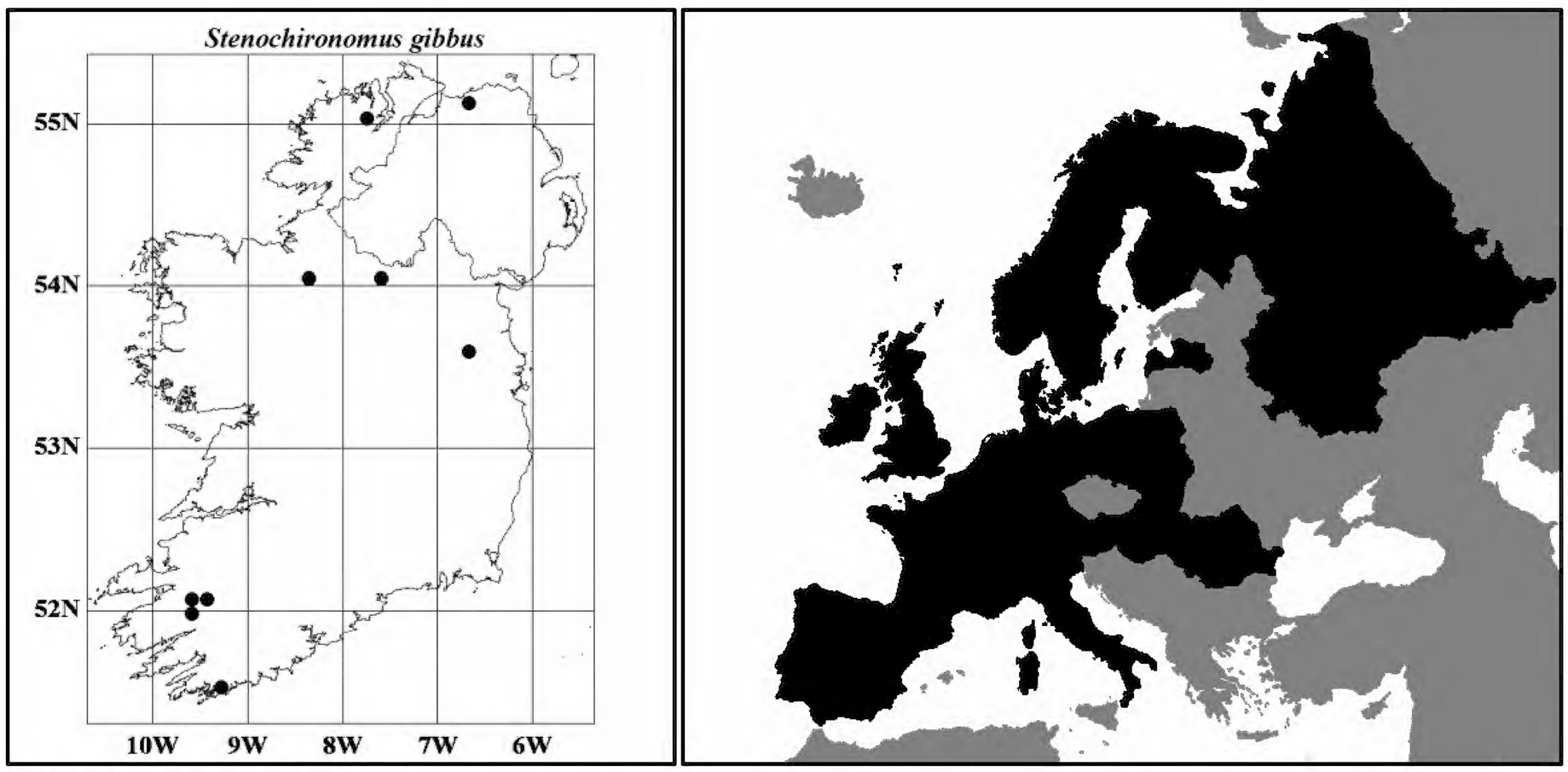
FIGURES 831-832. *Polypedilum cultellatum* Goetghebuer, 1931.



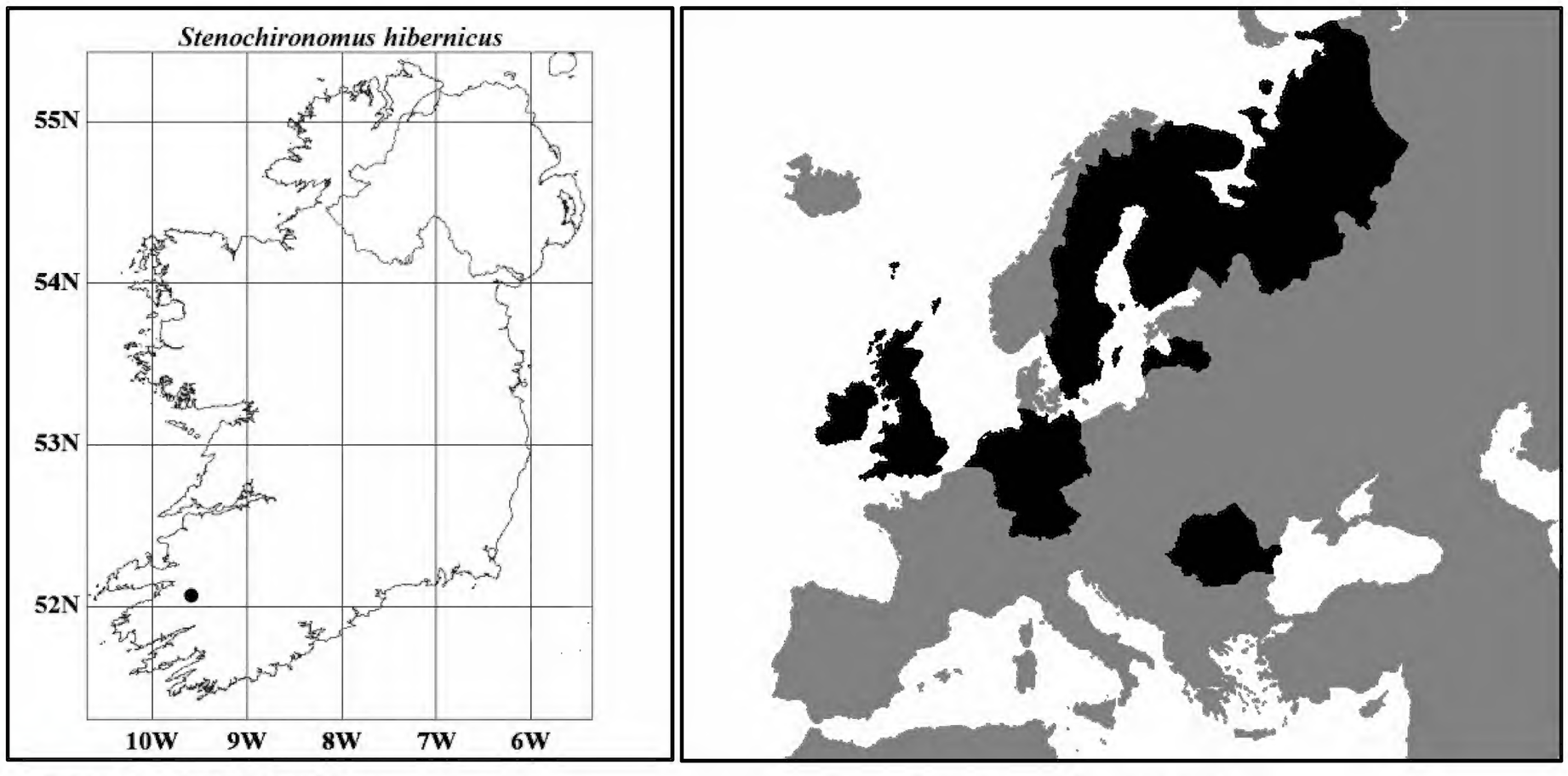
FIGURES 833-834. *Saetheria reissi* Jackson, 1977.



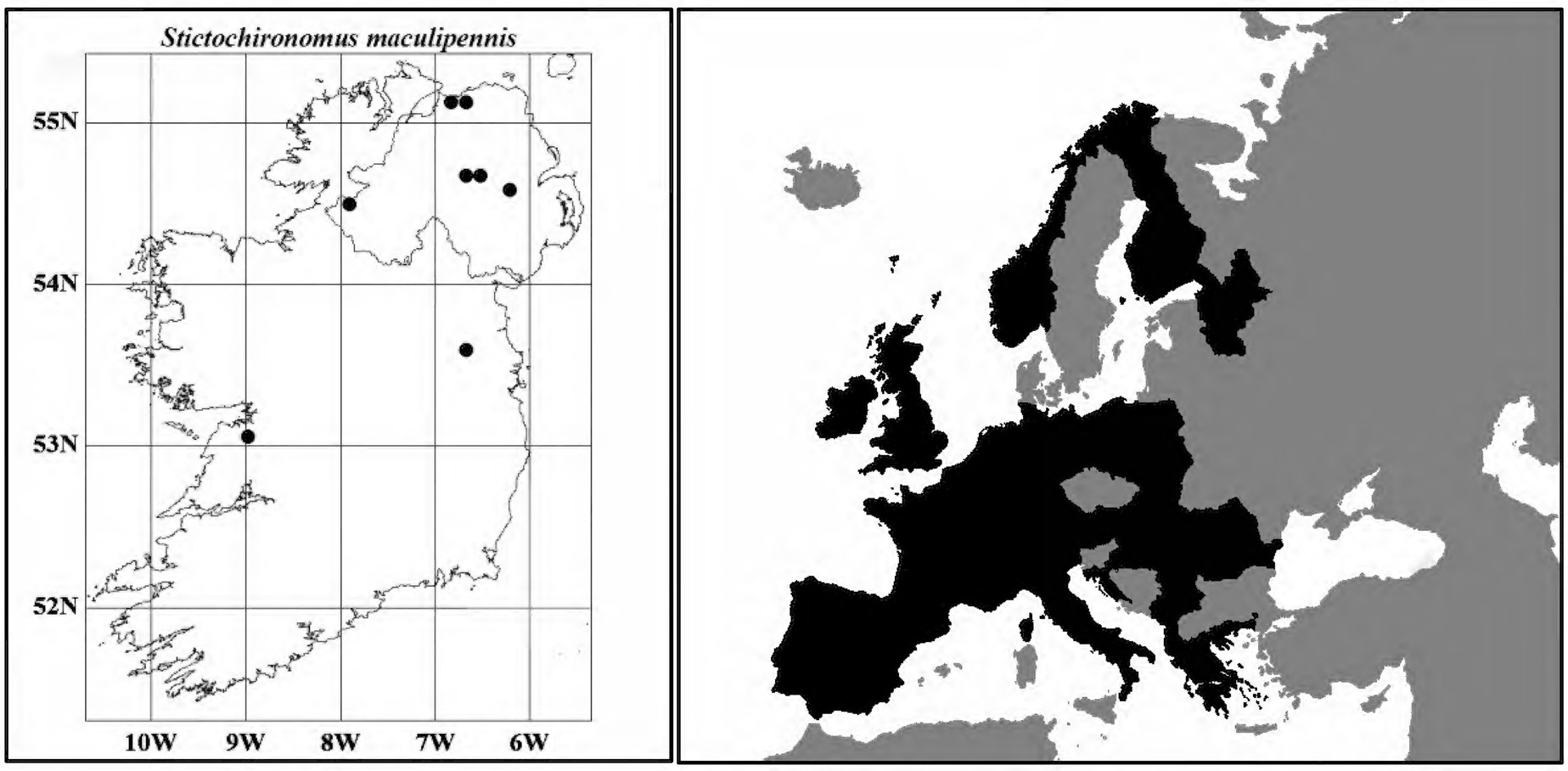
FIGURES 835-836. *Sergentia coracina* (Zetterstedt, 1850).



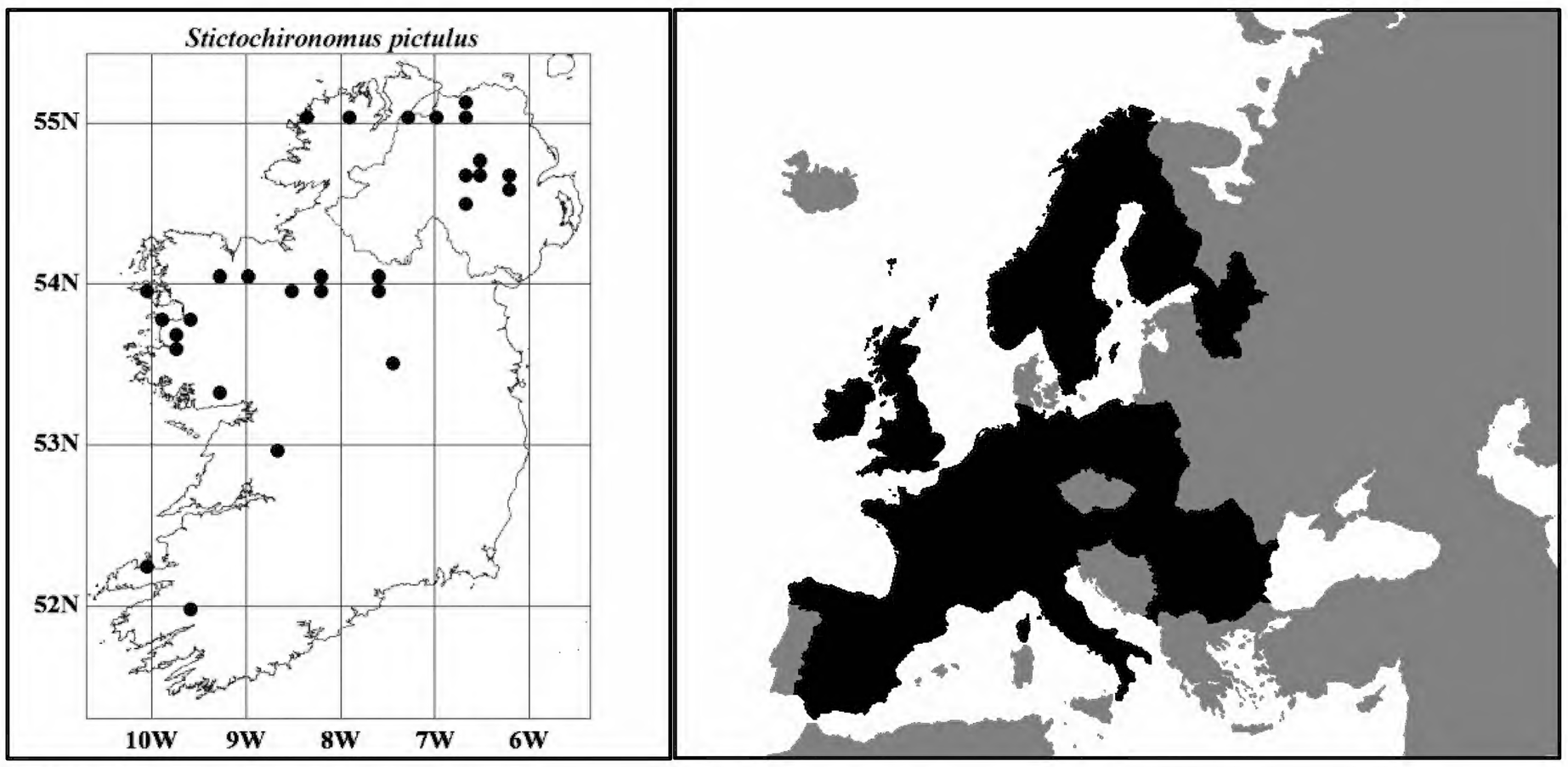
FIGURES 837-838. *Stenochironomus gibbus* (Fabricius, 1794).



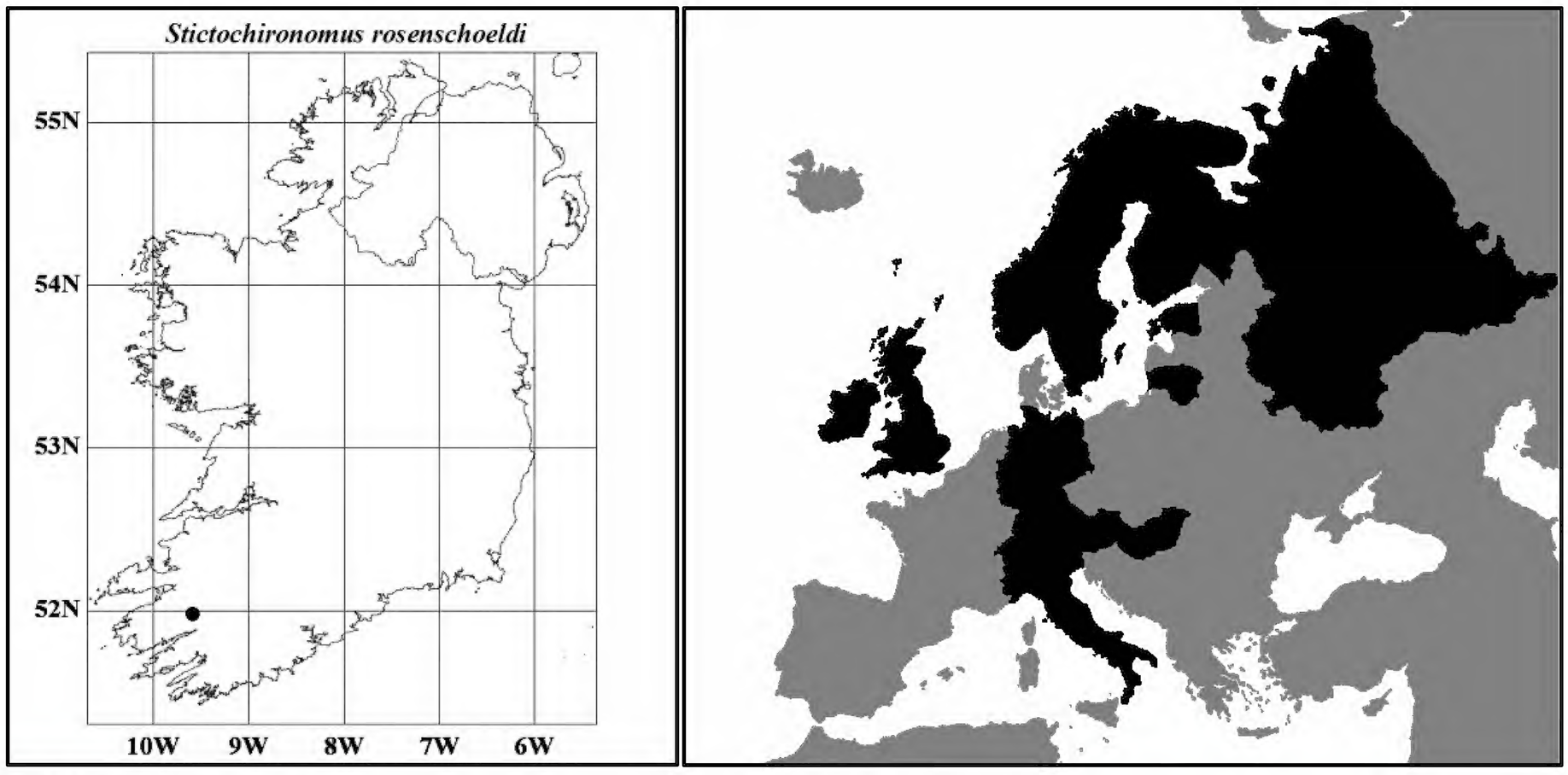
FIGURES 839-840. *Stenochironomus hibernicus* (Edwards, 1929).



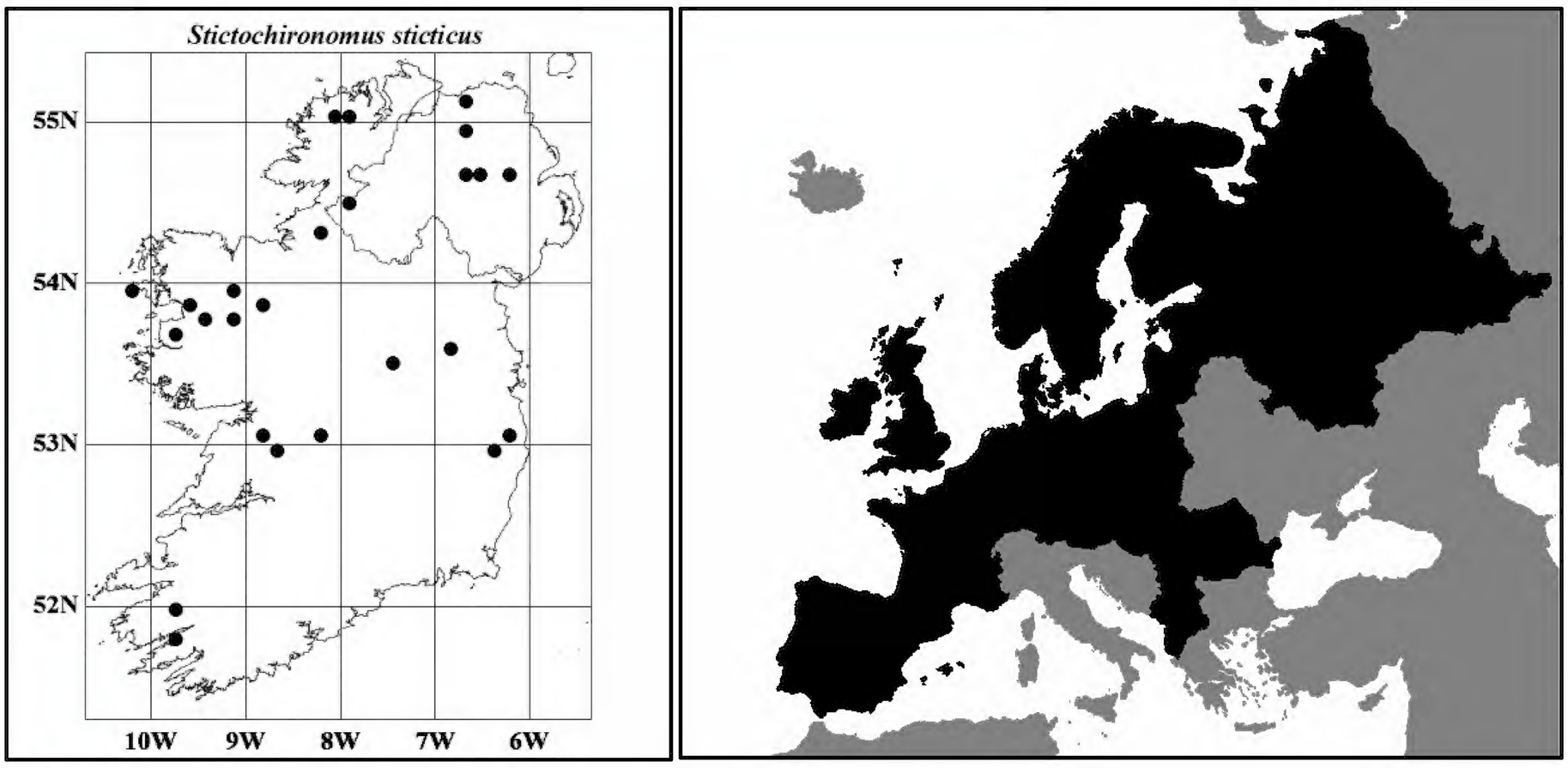
FIGURES 841-842. *Stictochironomus maculipennis* (Meigen, 1818).



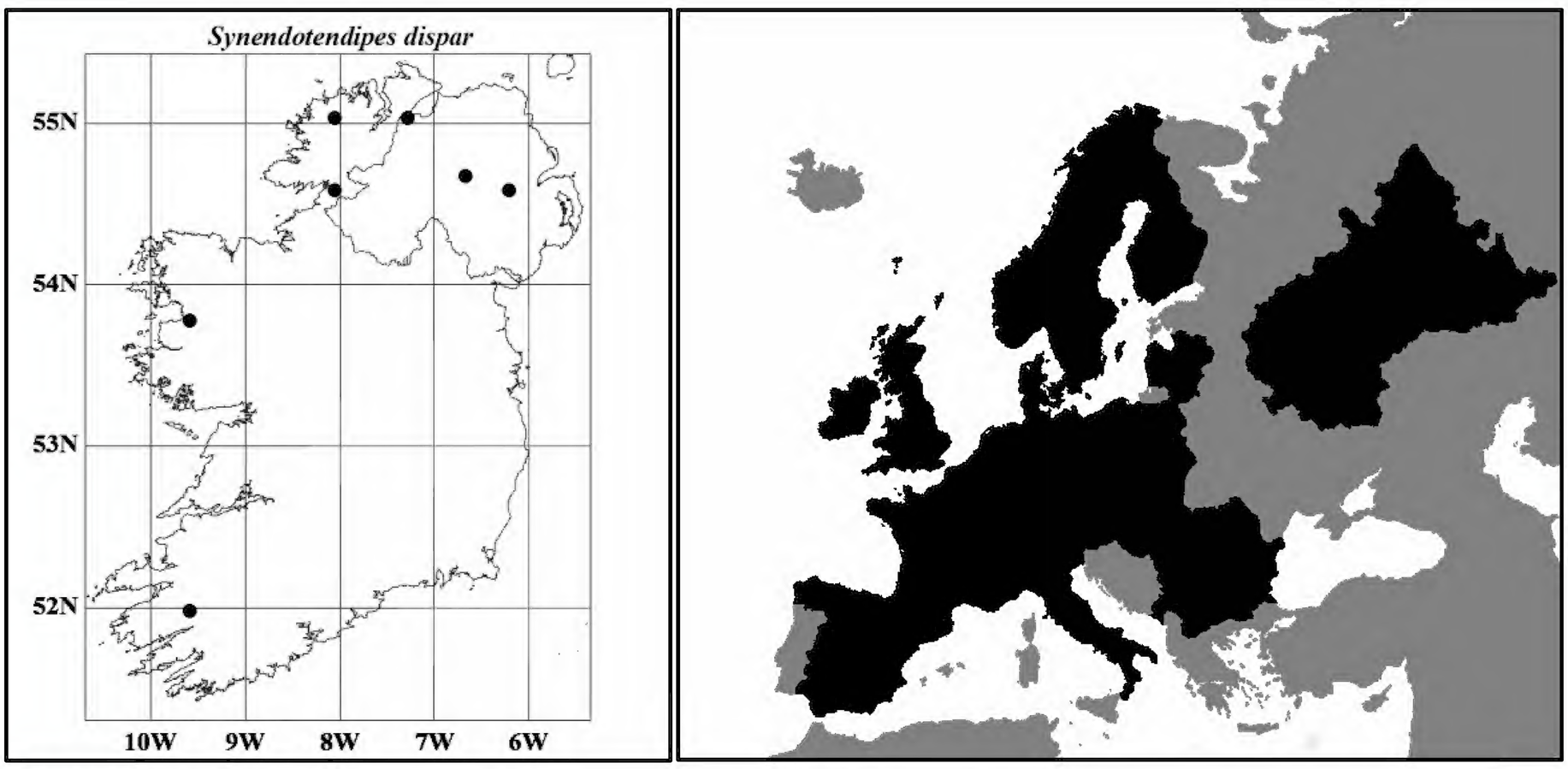
FIGURES 843-844. *Stictochironomus pictulus* (Meigen, 1830).



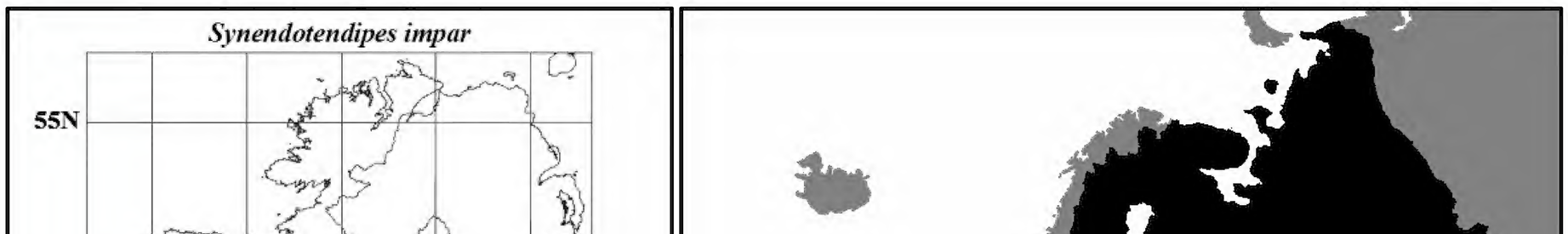
FIGURES 845-846. *Stictochironomus rosenscholdi* (Zetterstedt, 1838).



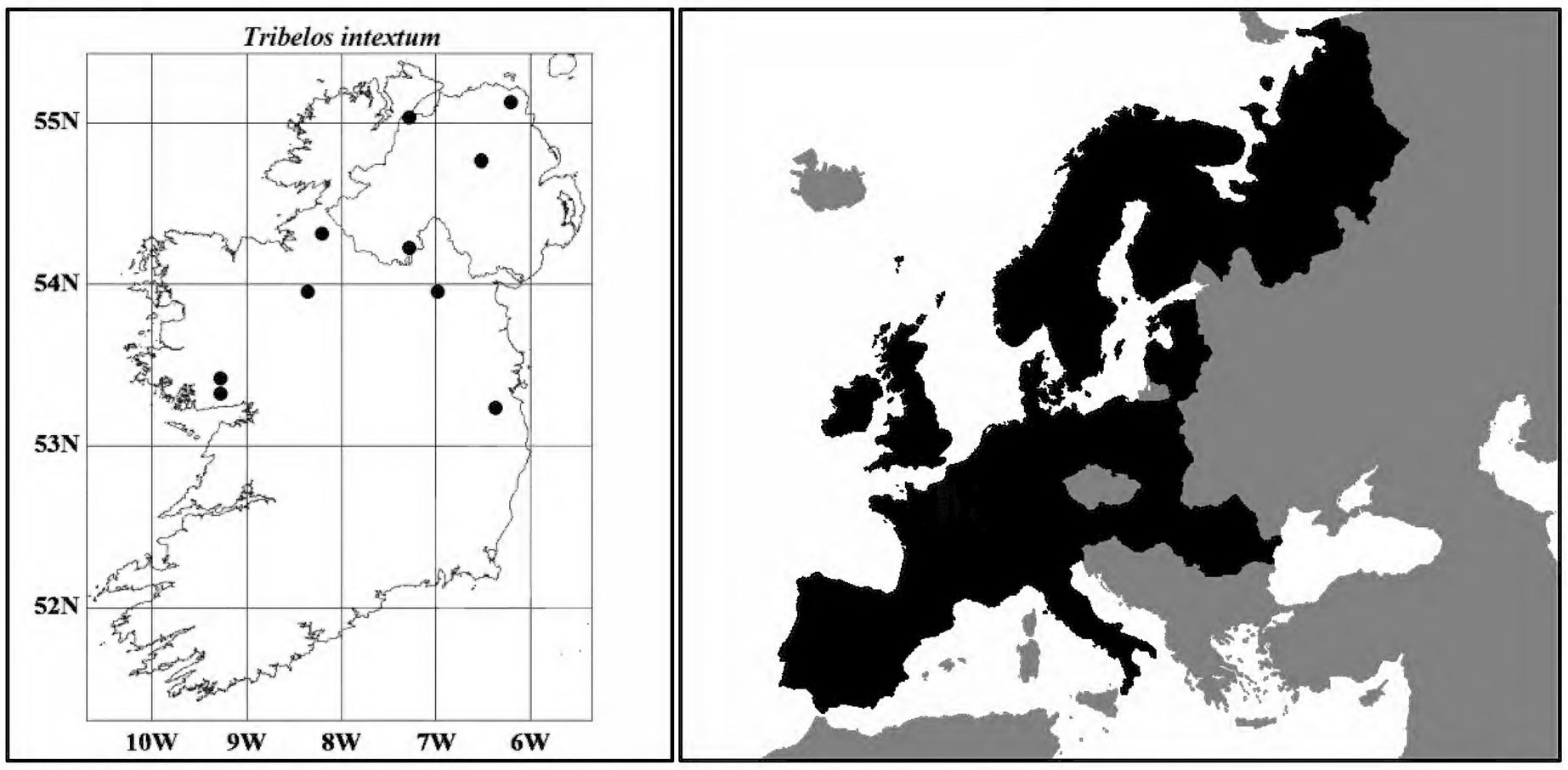
FIGURES 847-848. *Stictochironomus sticticus* (Fabricius, 1781).



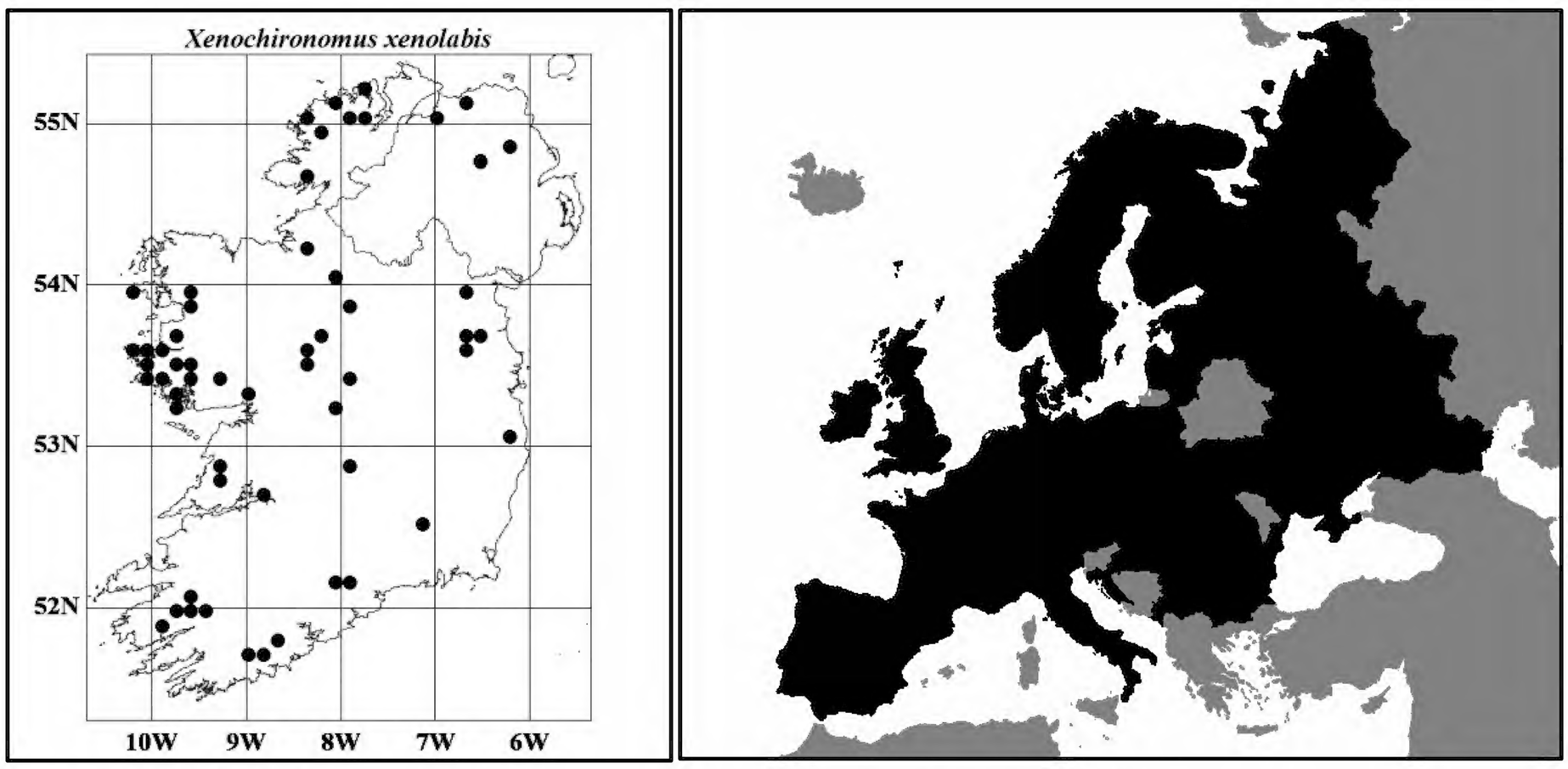
FIGURES 849-850. *Synendotendipes dispar* (Meigen, 1830).



FIGURES 851-852. *Synendotendipes impar* (Walker, 1856).

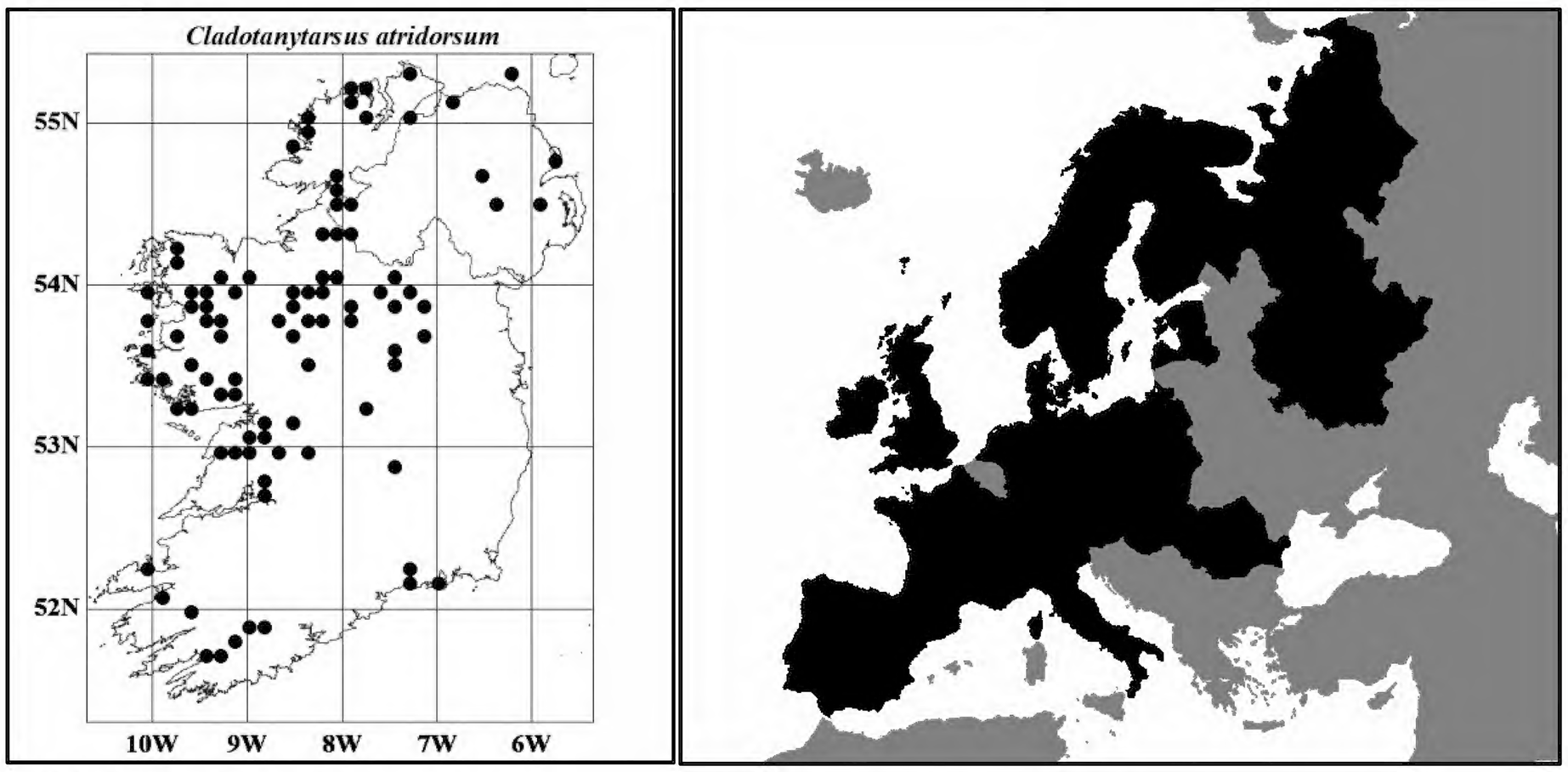


FIGURES 853-854. *Tribelos intextum* (Walker, 1856).

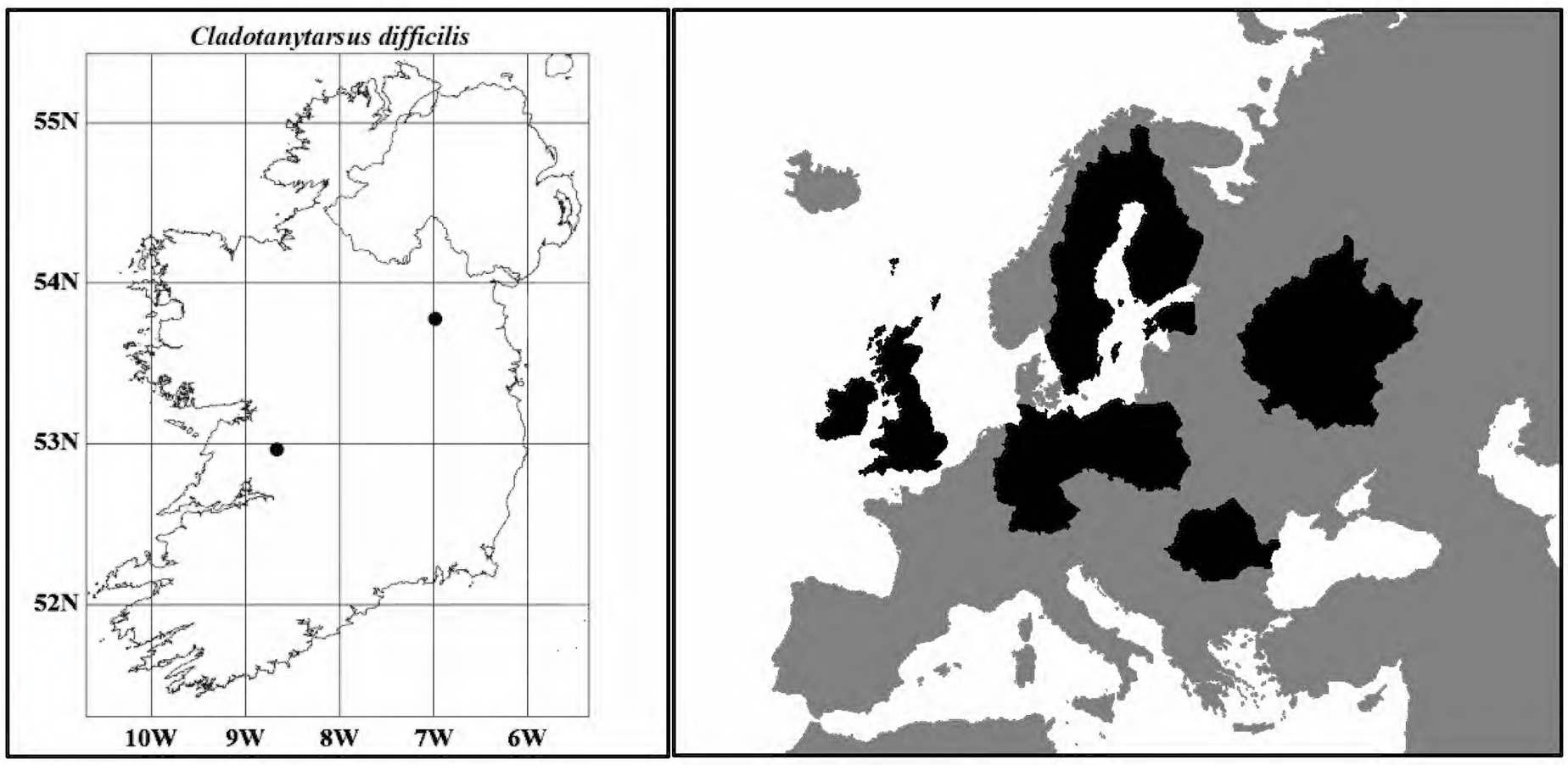


FIGURES 855-856. *Xenochironomus xenolabis* (Kieffer, 1916).

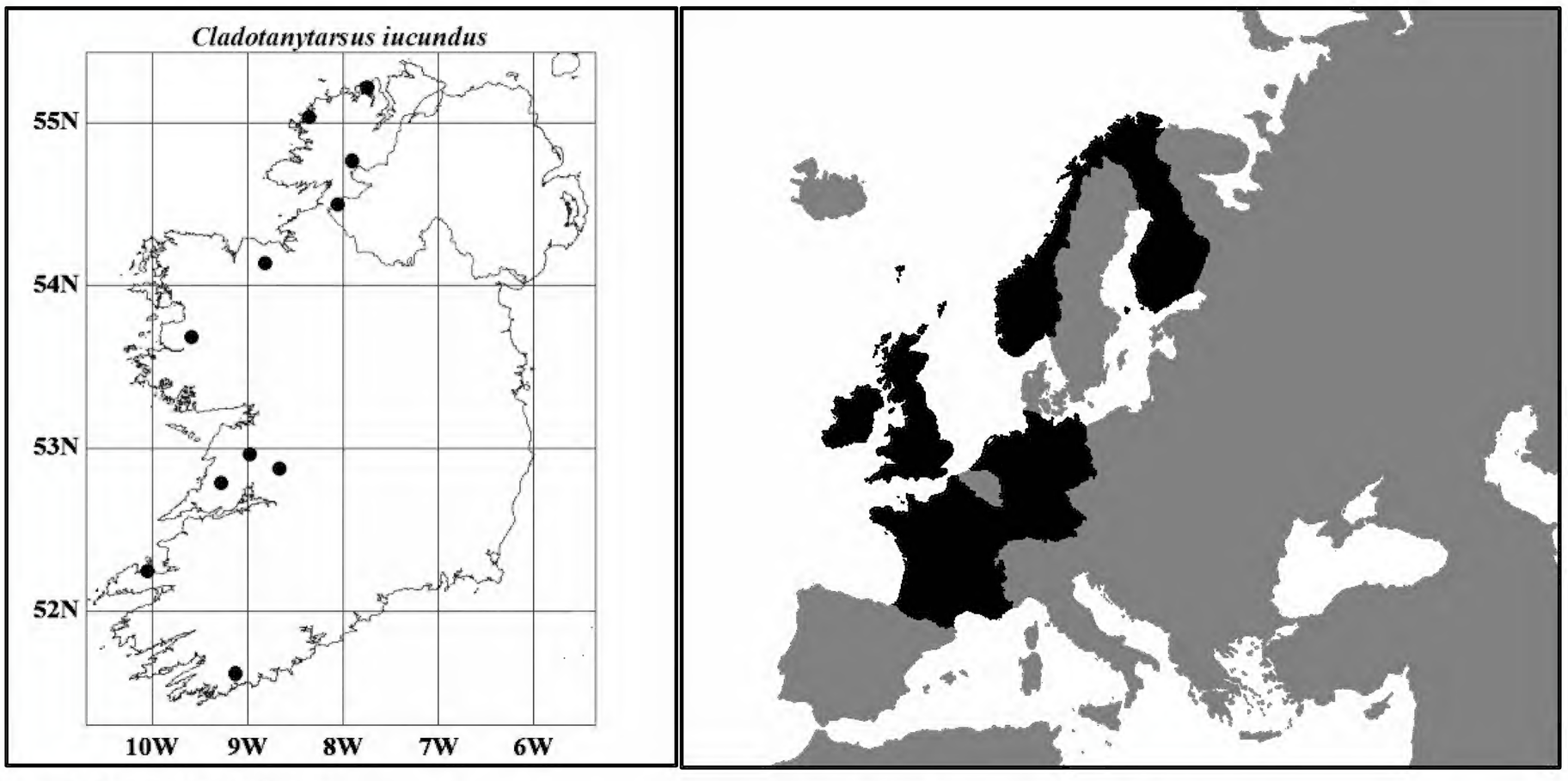
FIGURES 857-858. *Pseudochironomus prasinatus* (Staeger, 1839).



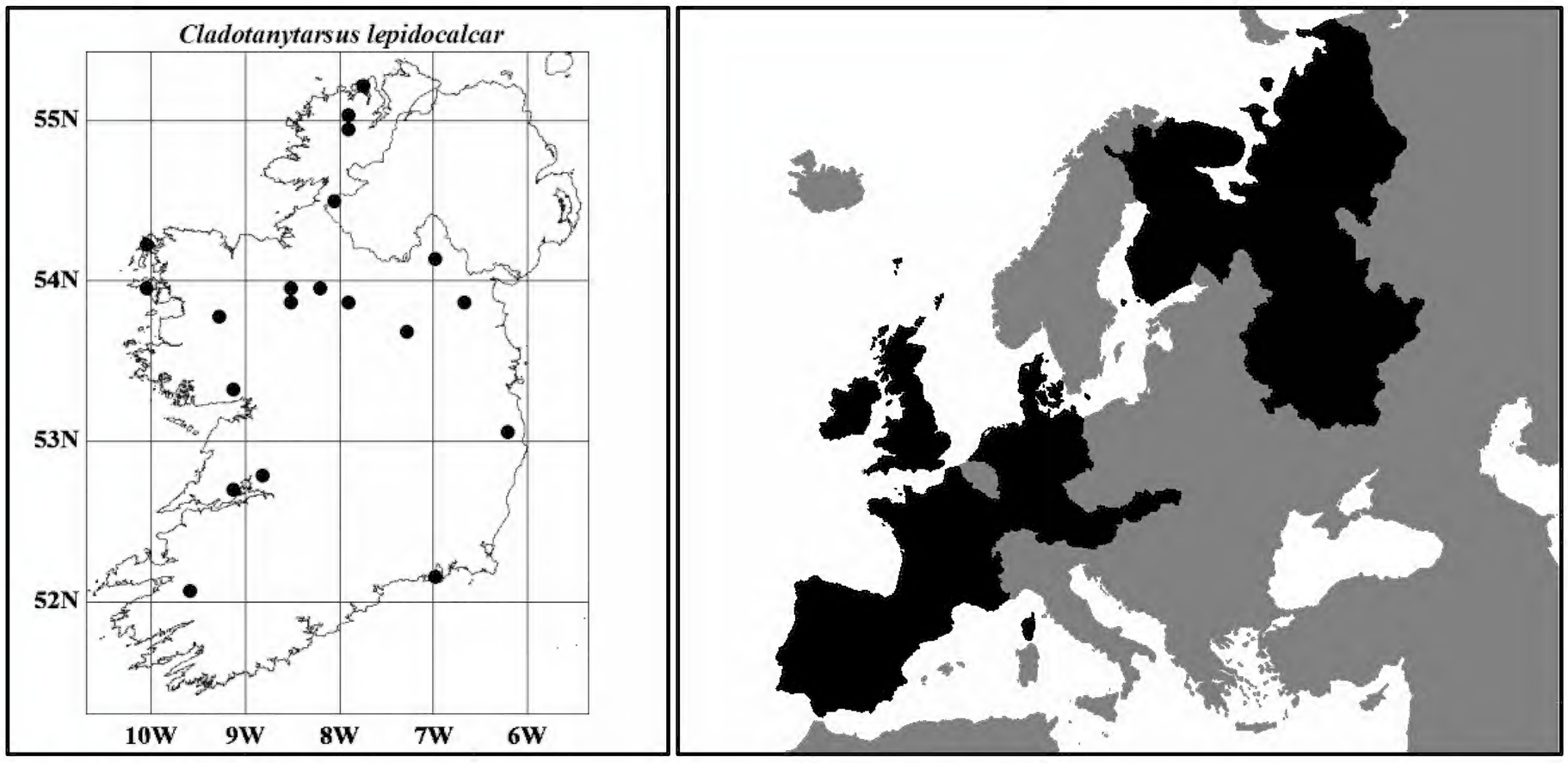
FIGURES 859-860. *Cladotanytarsus atridorsum* Kieffer, 1924.



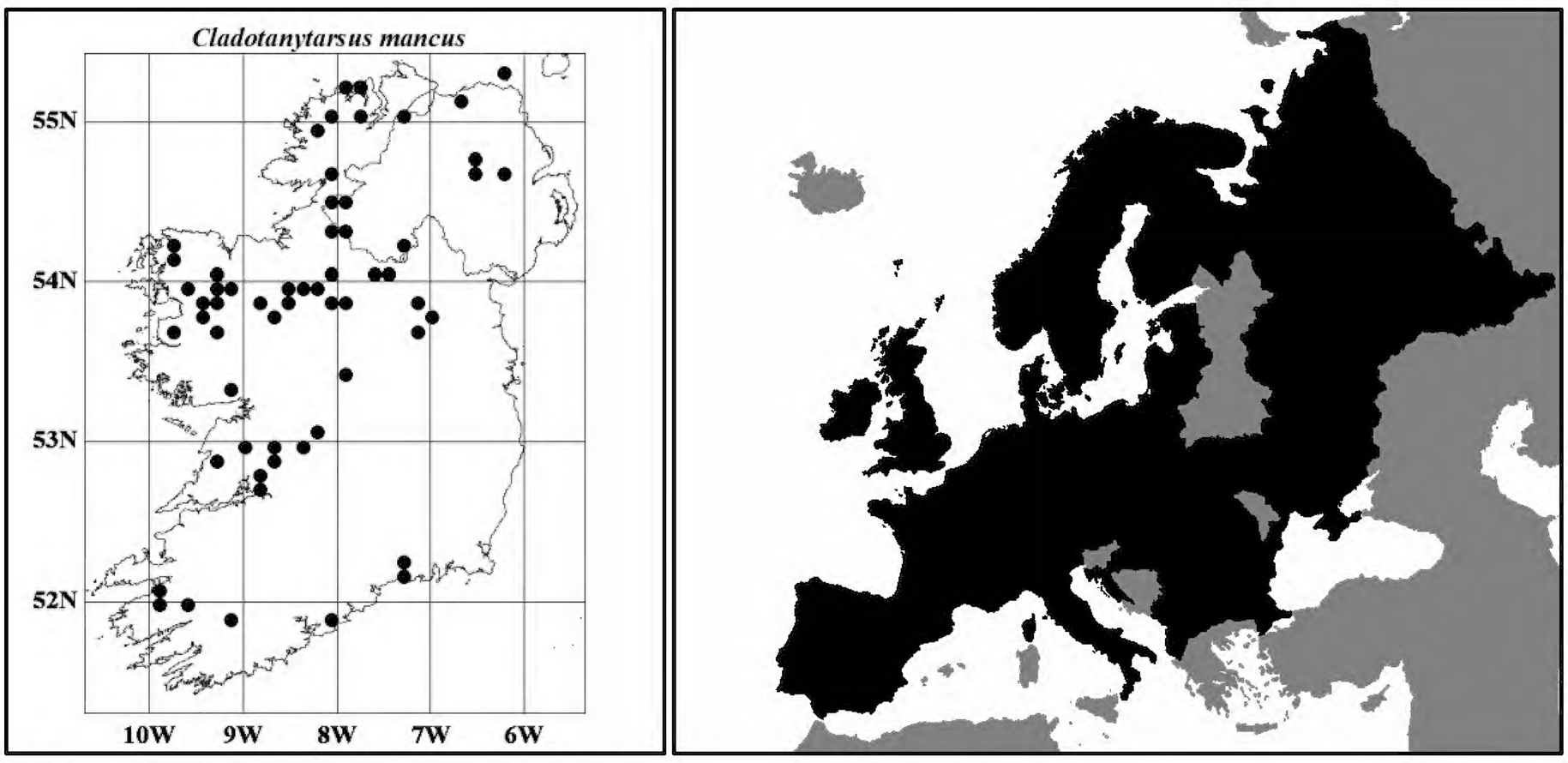
FIGURES 861-862. *Cladotanytarsus difficilis* Brundin, 1947.



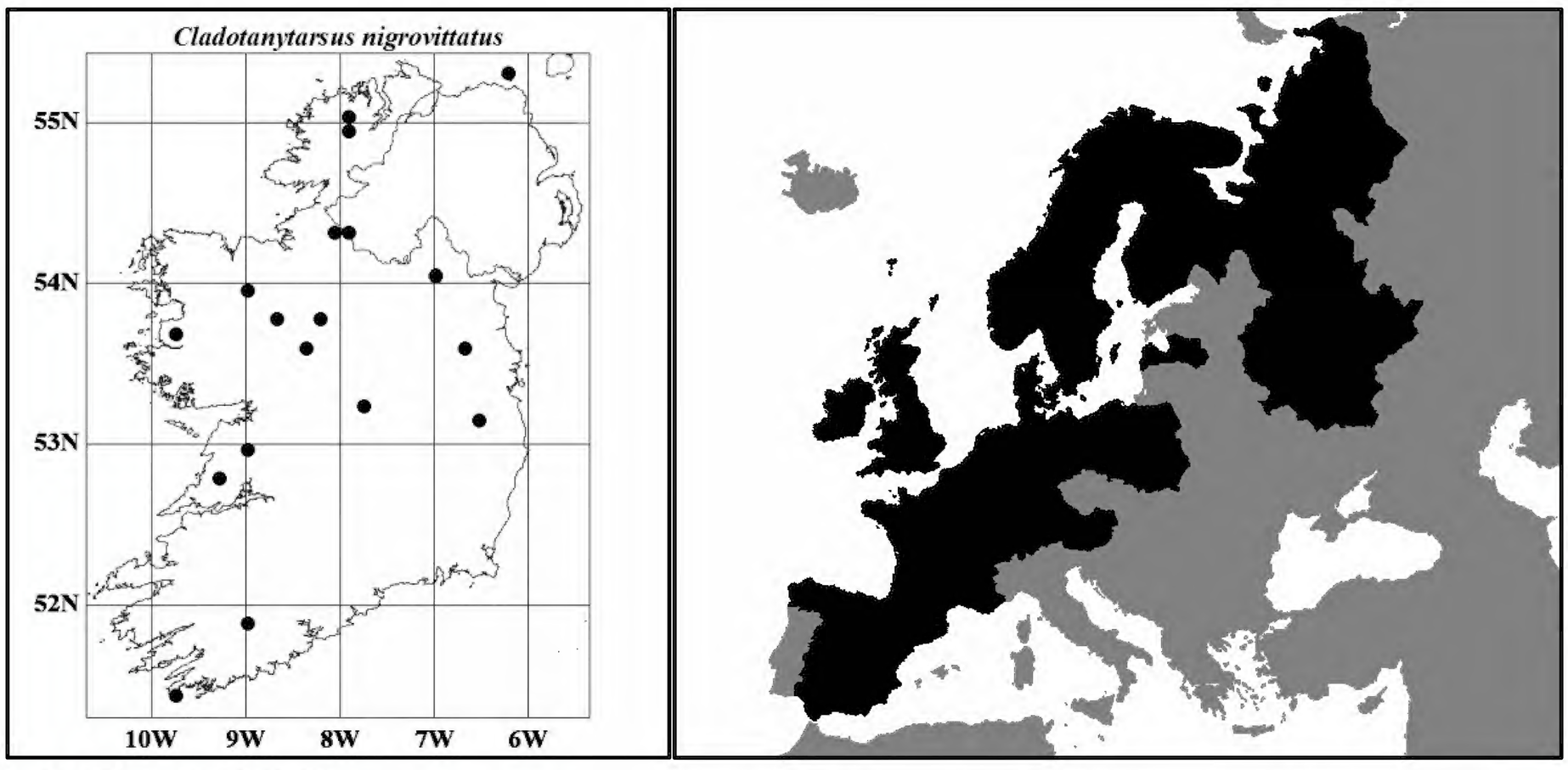
FIGURES 863-864. *Cladotanytarsus iucundus* Hirvenoja, 1962.



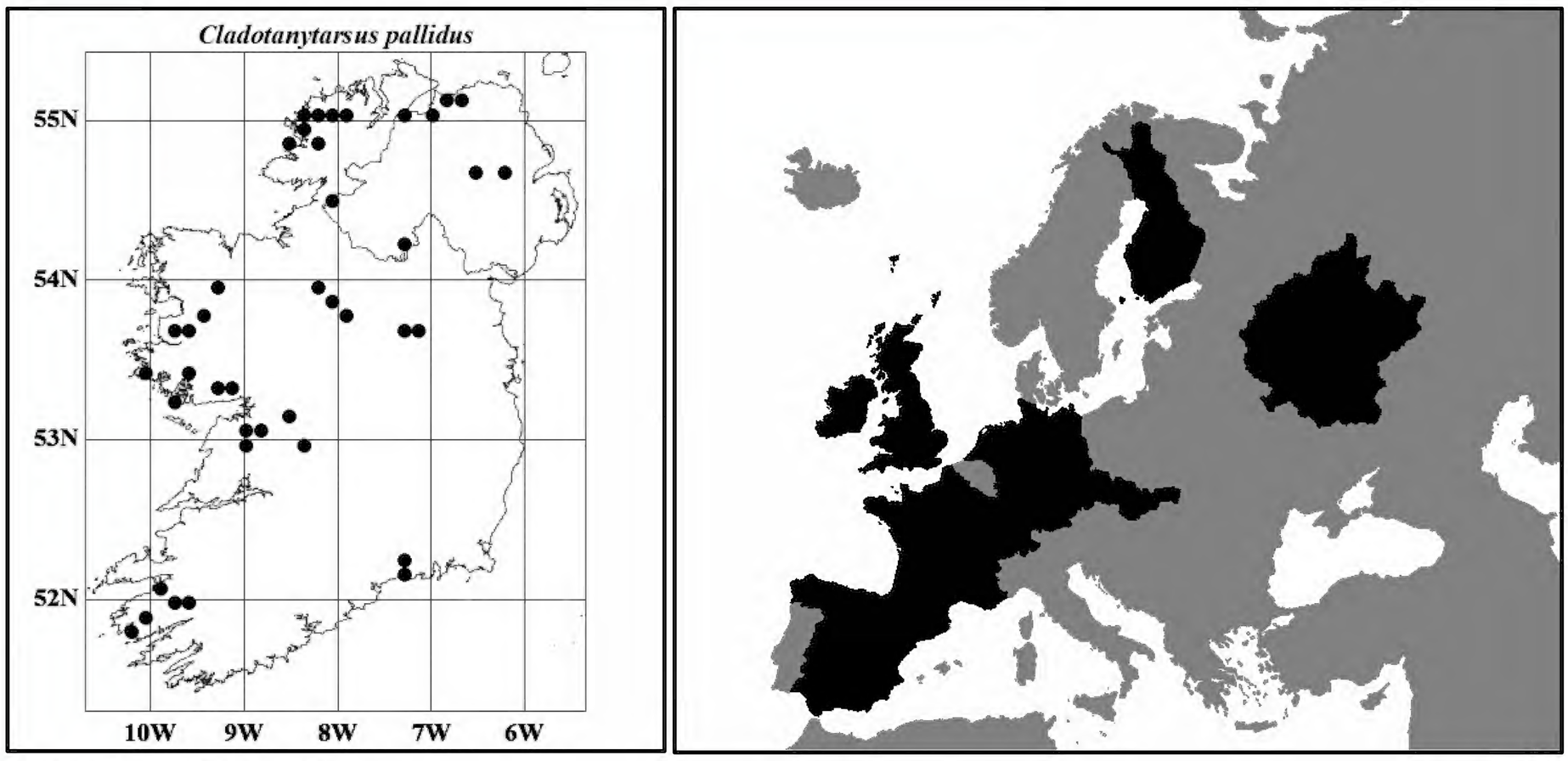
FIGURES 865-866. *Cladotanytarsus lepidocalcar* Krueger, 1938.



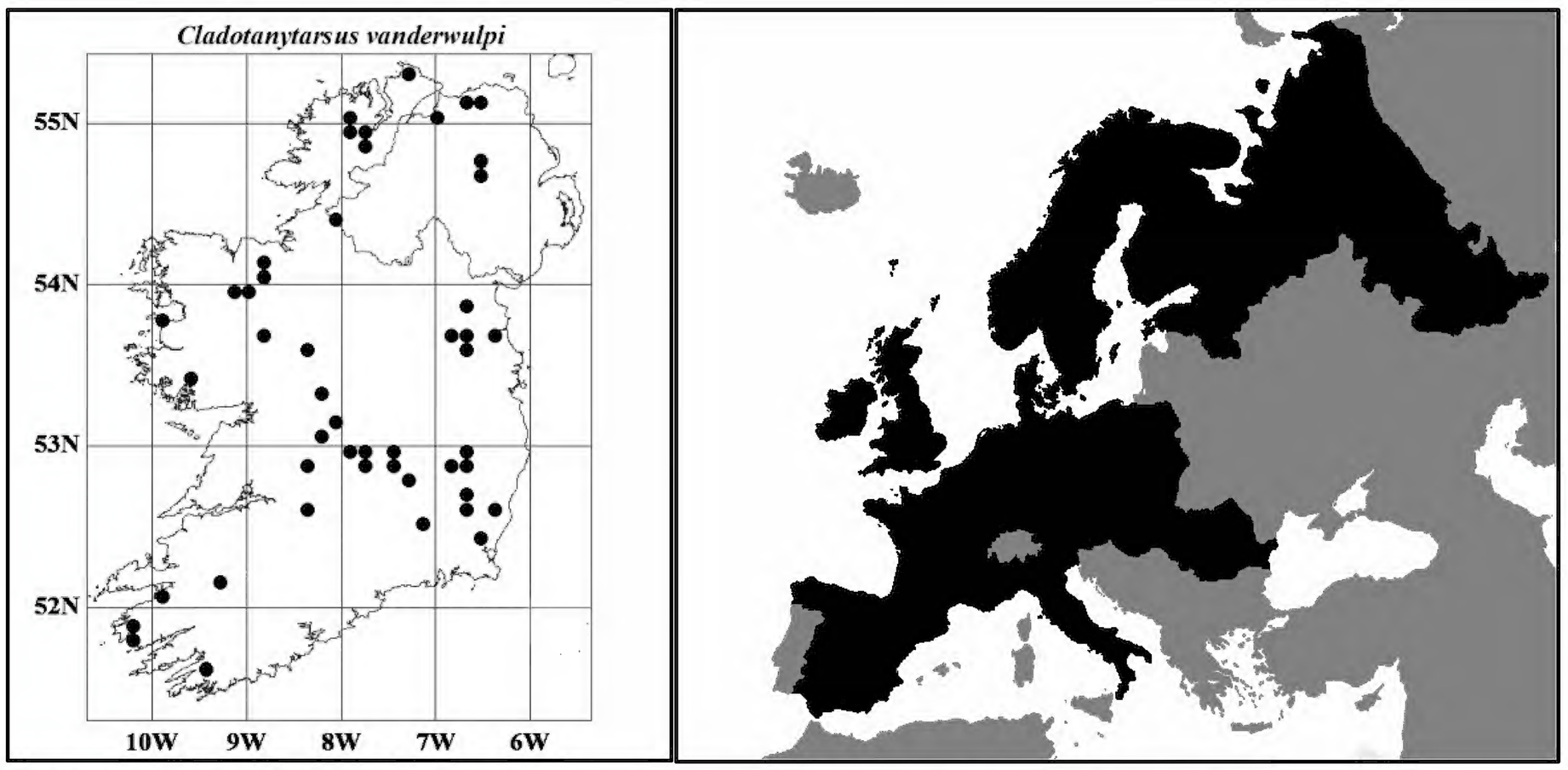
FIGURES 867-868. *Cladotanytarsus mancus* (Walker, 1856).



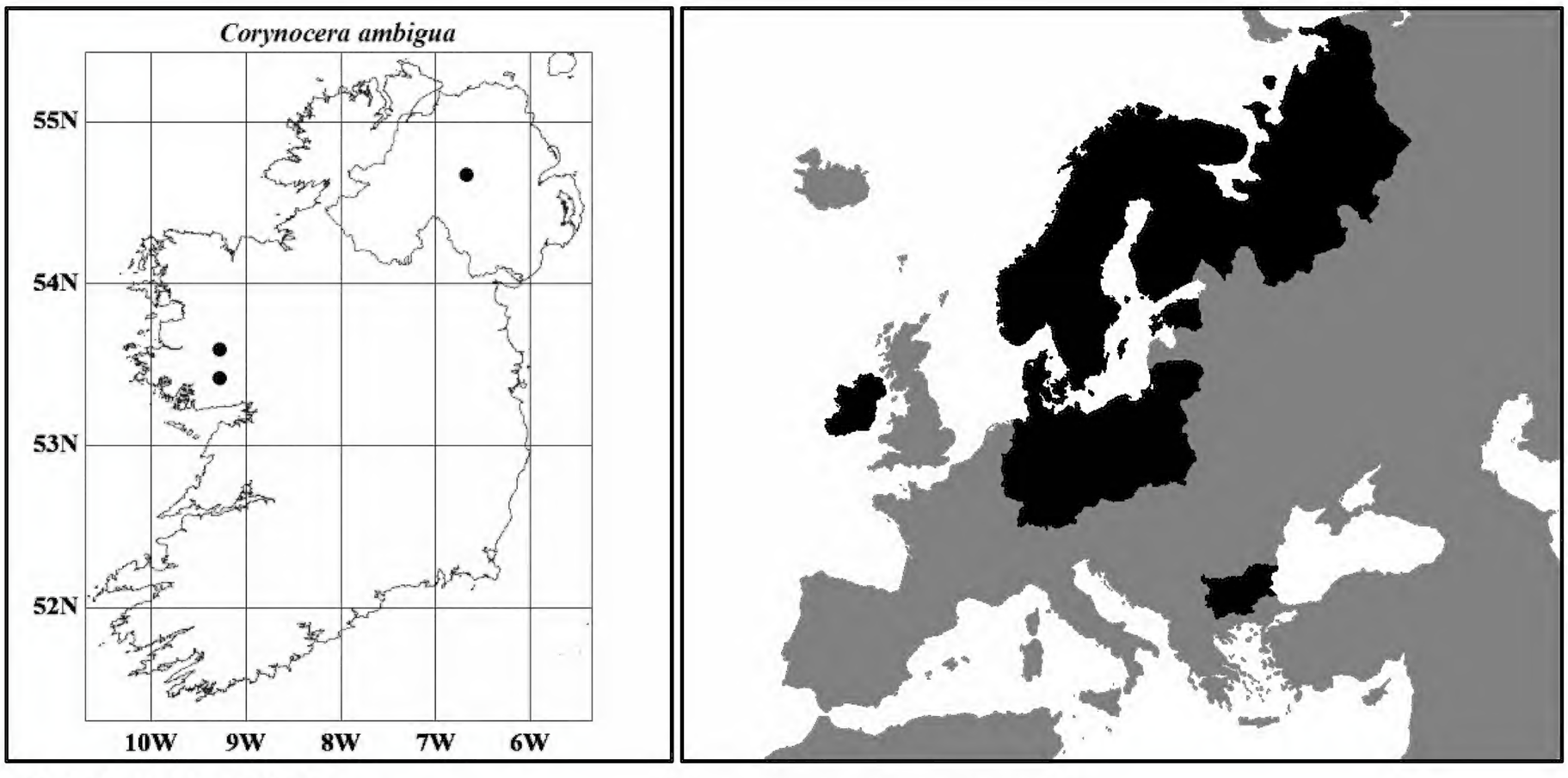
FIGURES 869-870. *Cladotanytarsus nigrovittatus* (Goetghebuer, 1922).



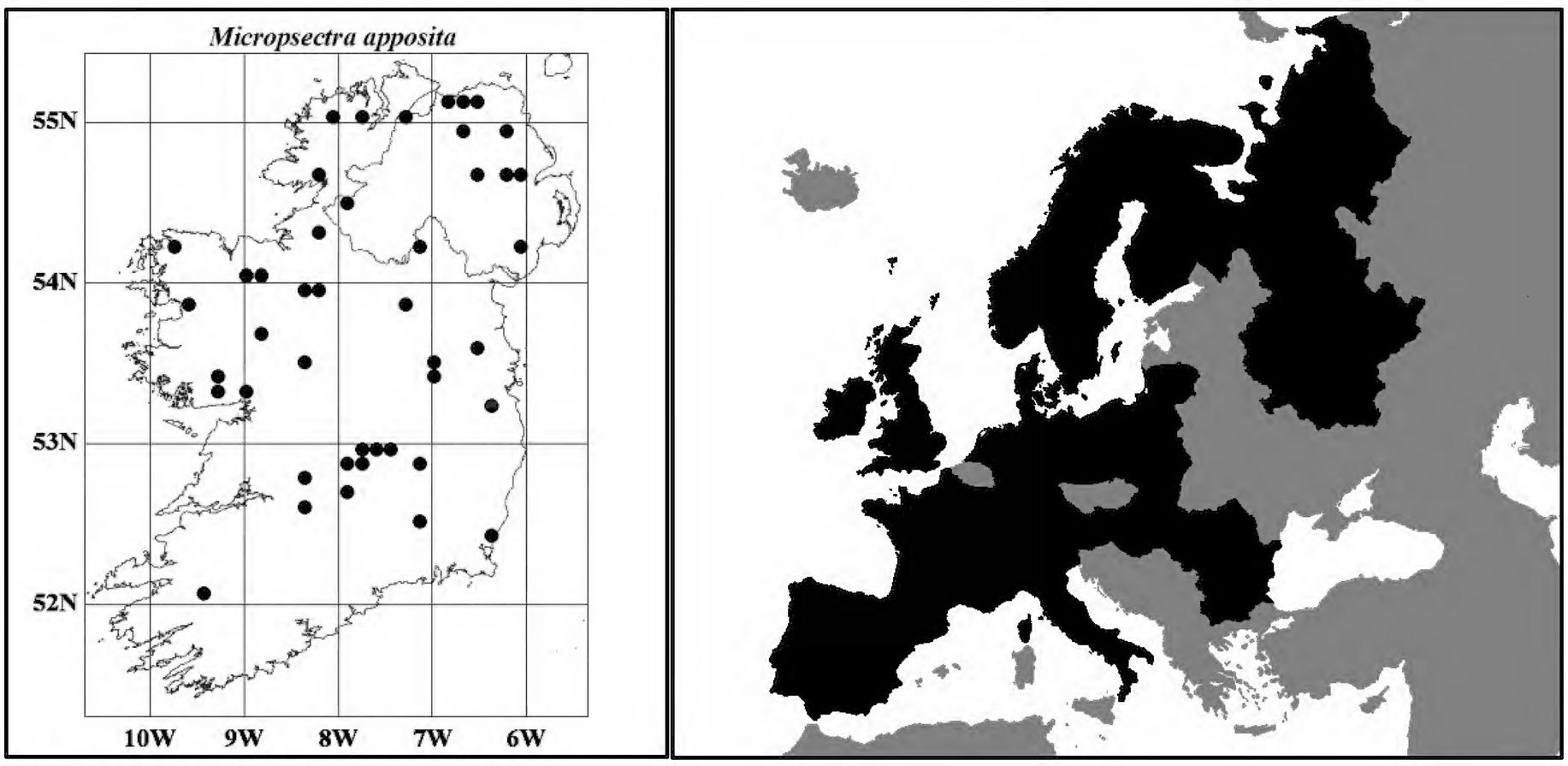
FIGURES 871-872. *Cladotanytarsus pallidus* Kieffer, 1922.



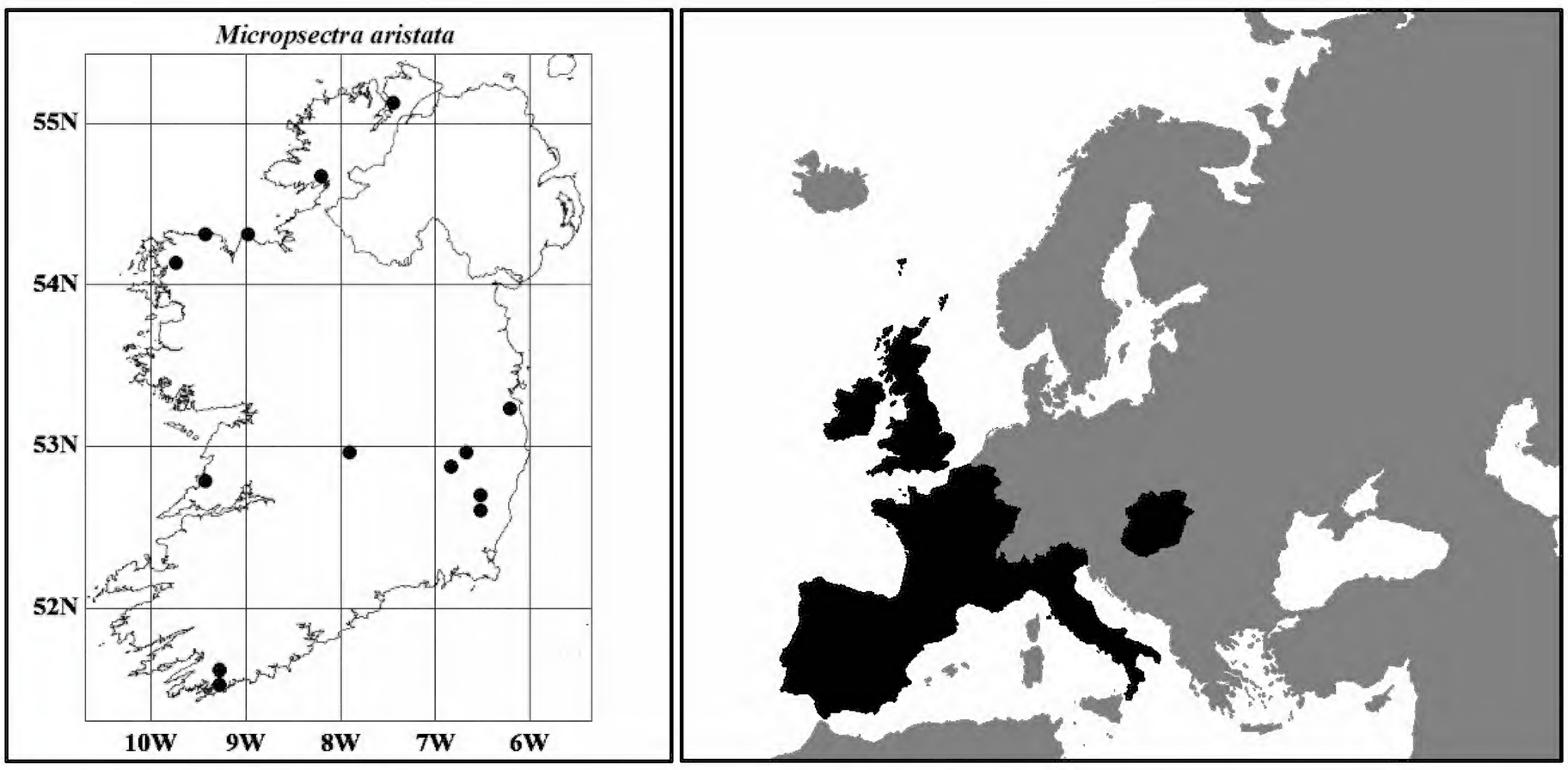
FIGURES 873-874. *Cladotanytarsus vanderwulpi* (Edwards, 1929).



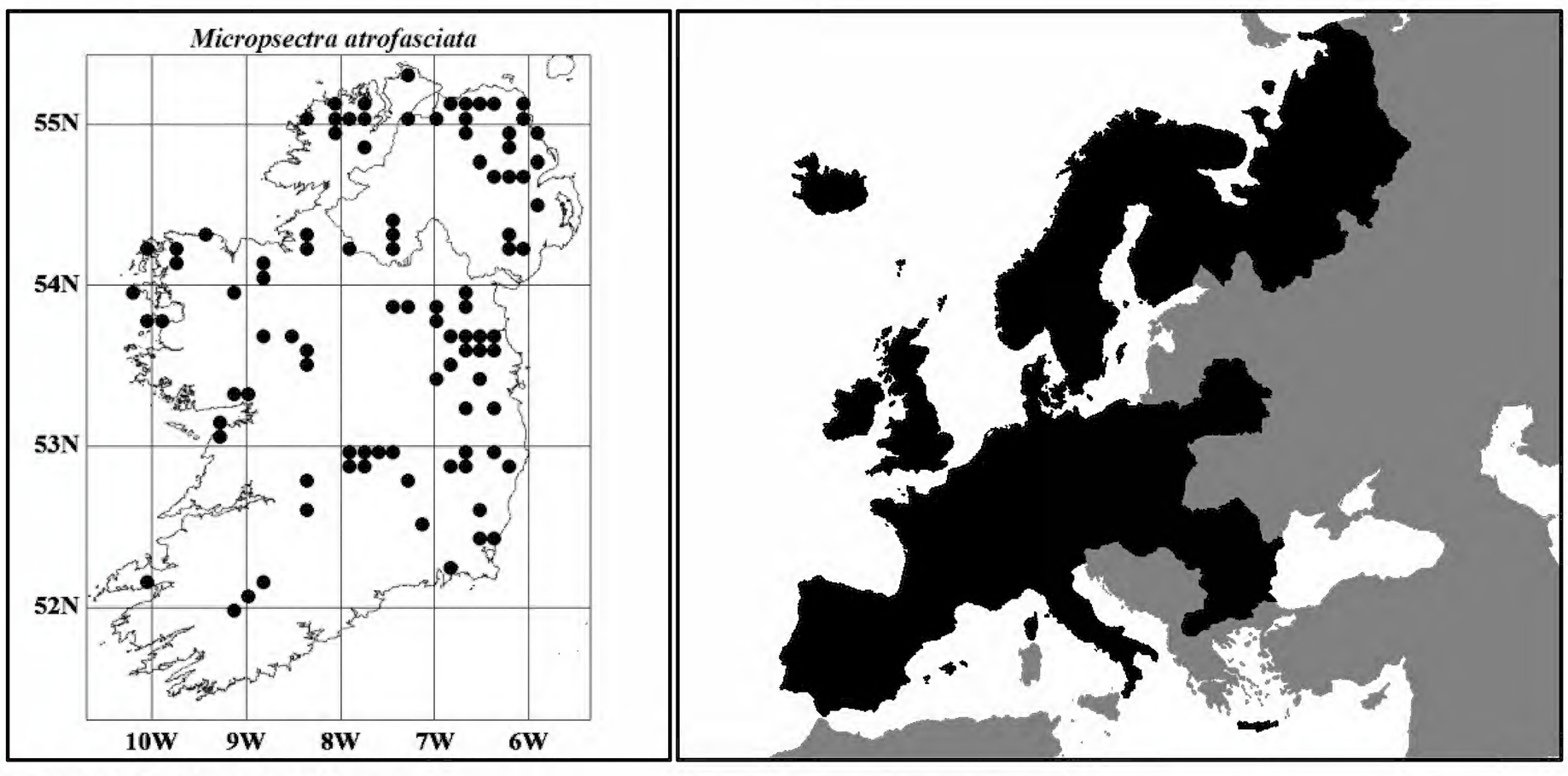
FIGURES 875-876. *Corynocera ambigua* Zetterstedt, 1837.



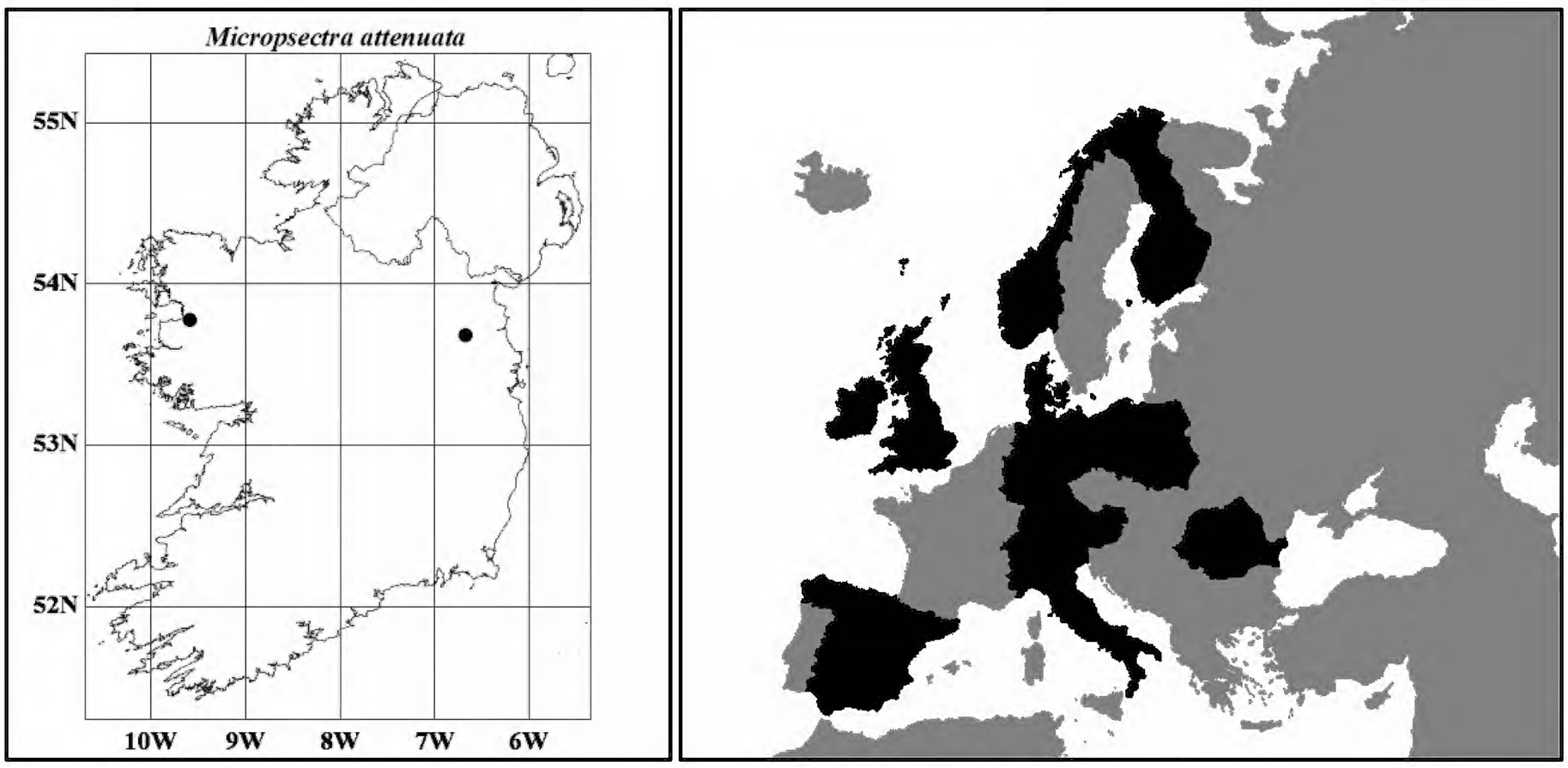
FIGURES 877-878. *Micropsectra apposita* (Walker, 1856).



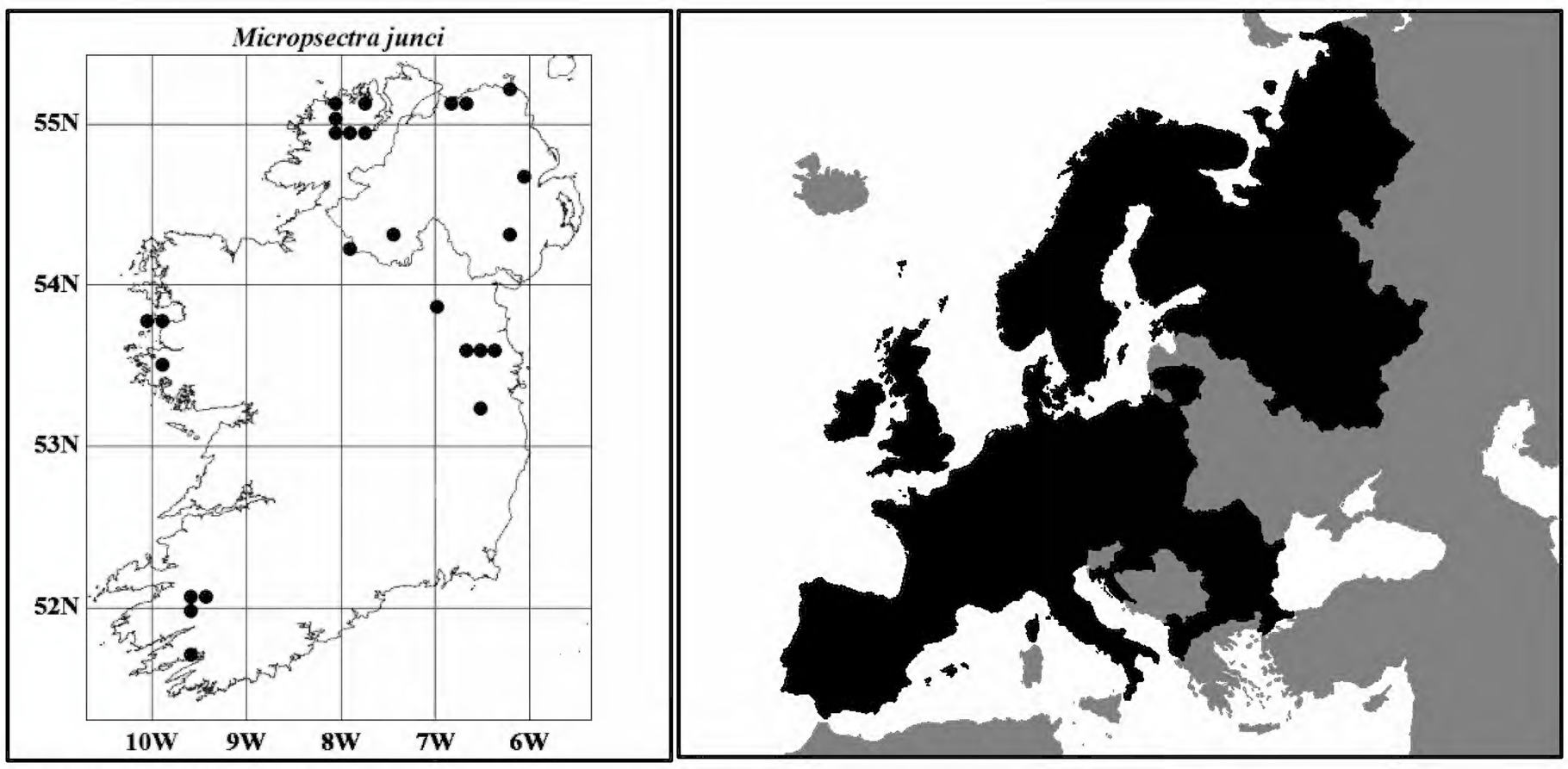
FIGURES 879-880. *Micropsectra aristata* Pinder, 1976.



FIGURES 881-882. *Micropsectra atrofasciata* (Kieffer, 1911).

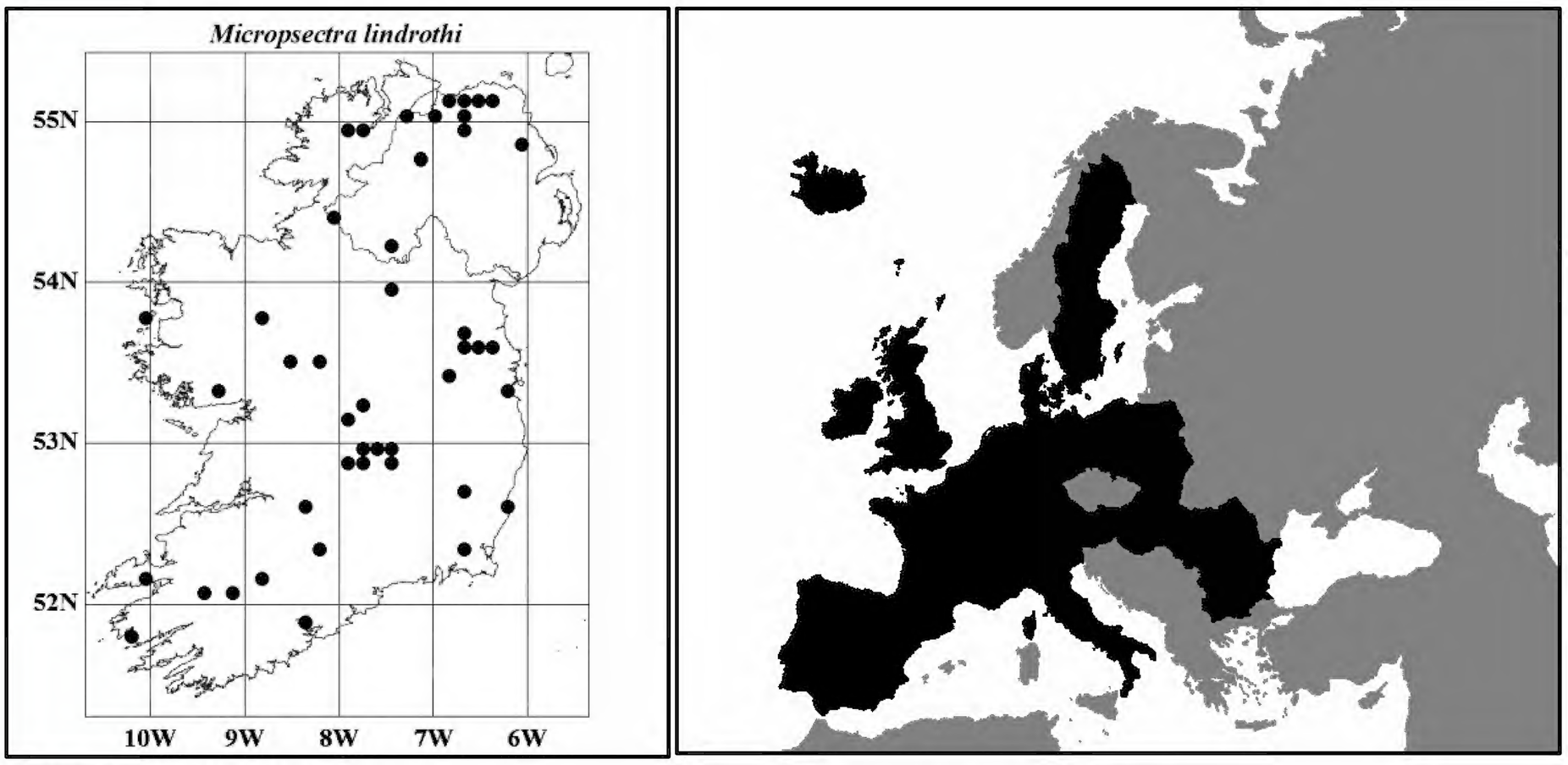


FIGURES 883-884. *Micropsectra attenuata* Reiss, 1969.

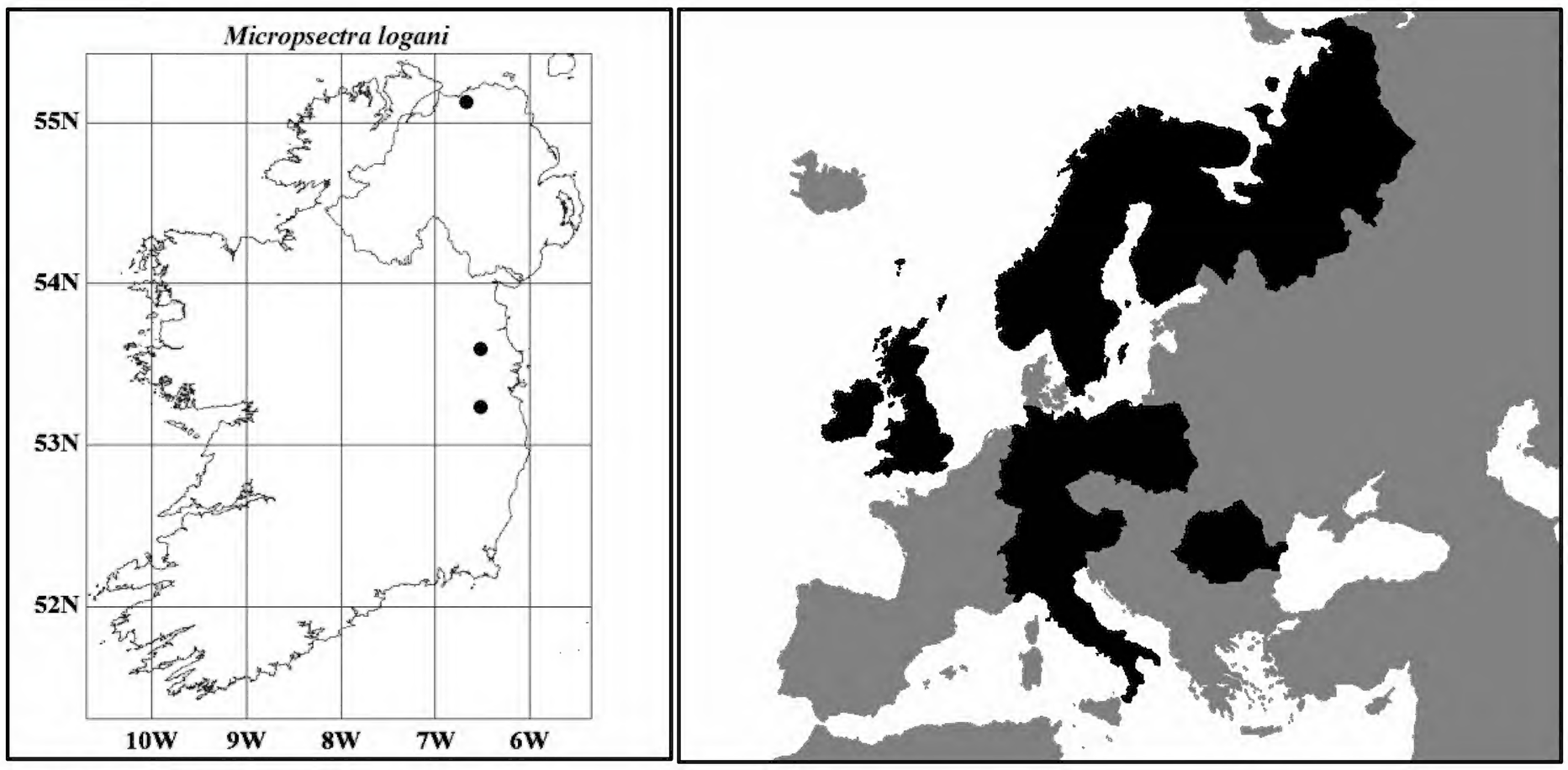


FIGURES 885-886. *Micropsectra junci* (Meigen, 1818).

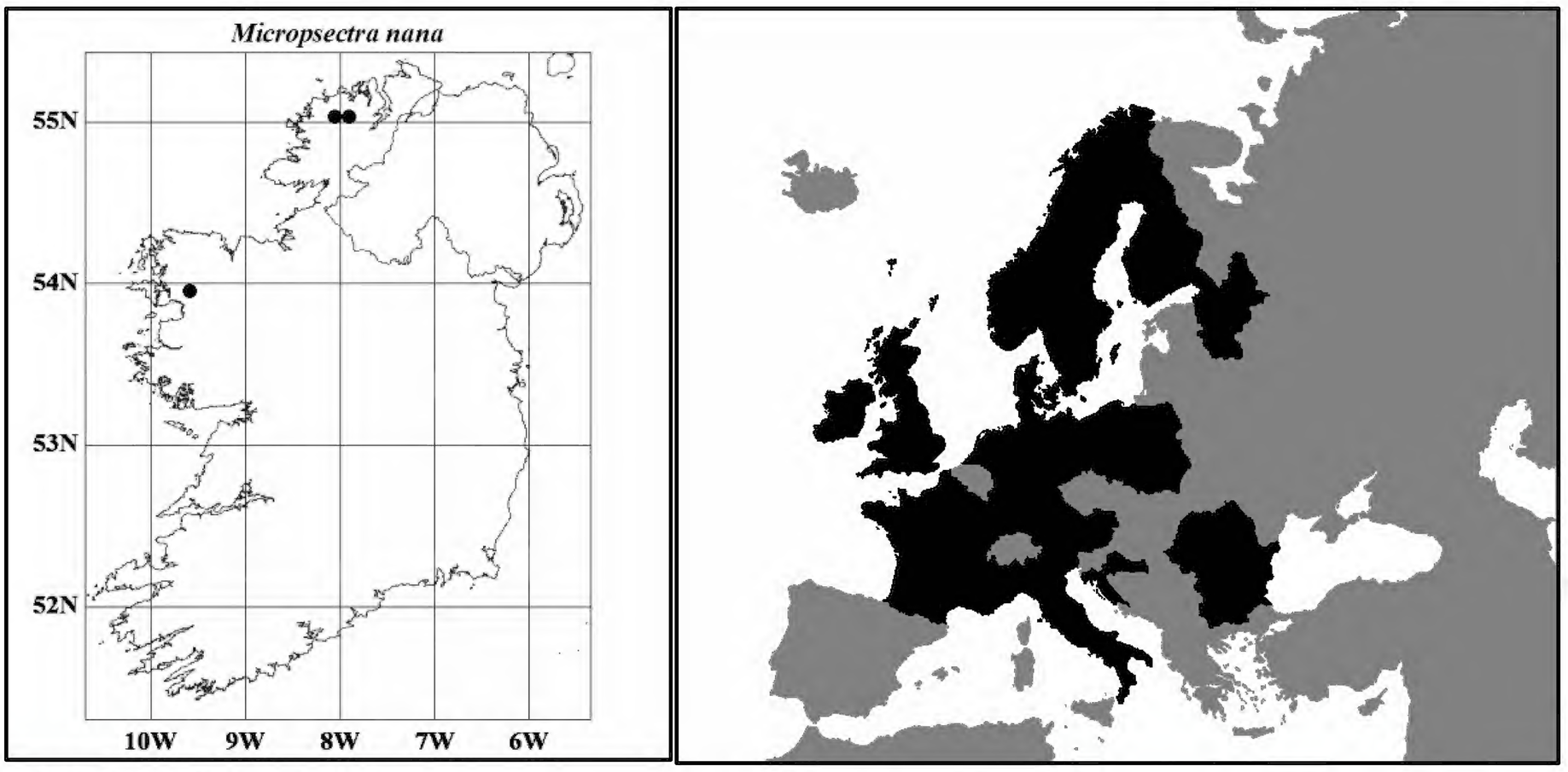
FIGURES 887-888. *Micropsectra lindebergi* Saewedal, 1976.



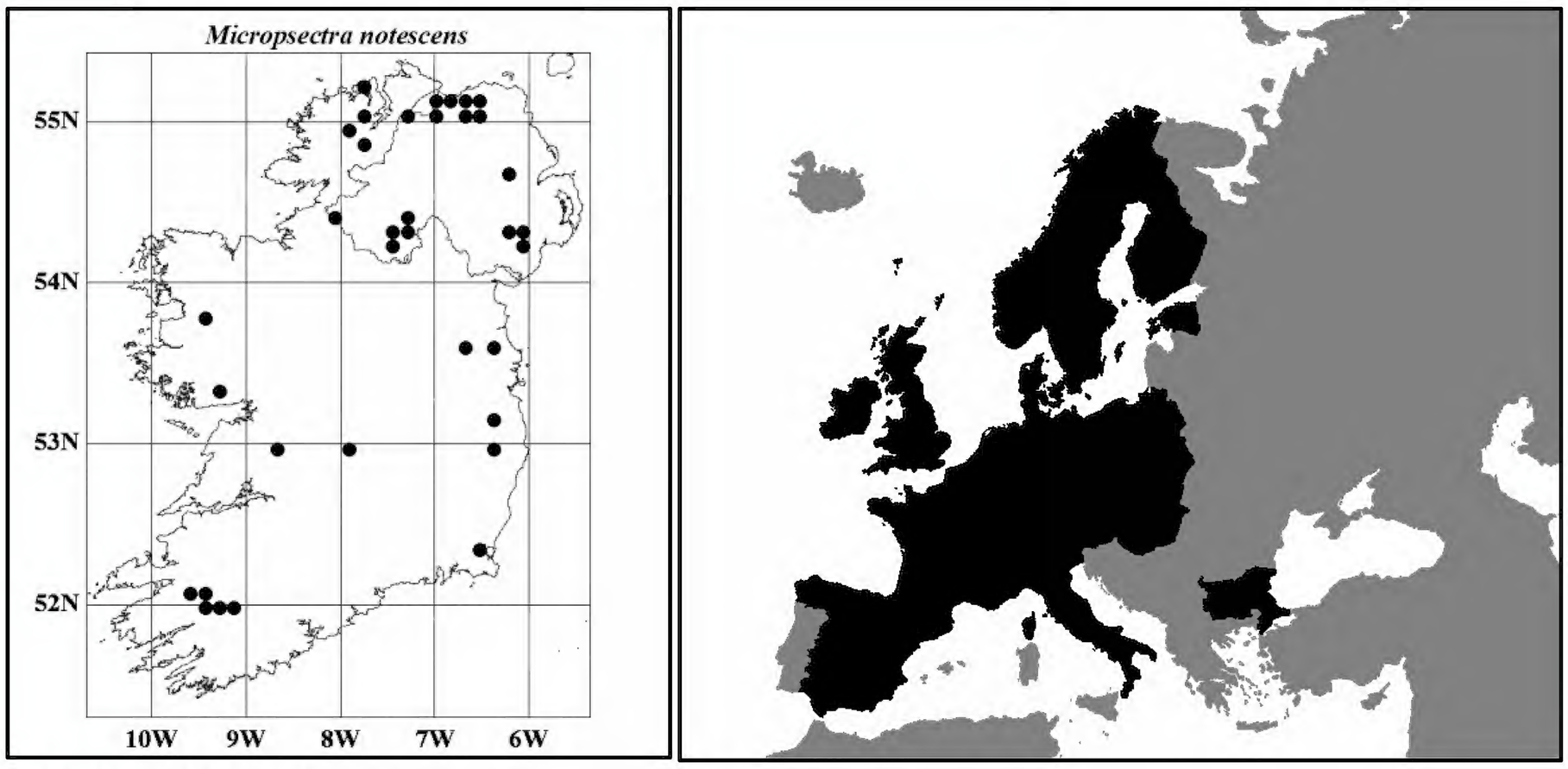
FIGURES 889-890. *Micropsectra lindrothi* Goetghebuer, 1931.



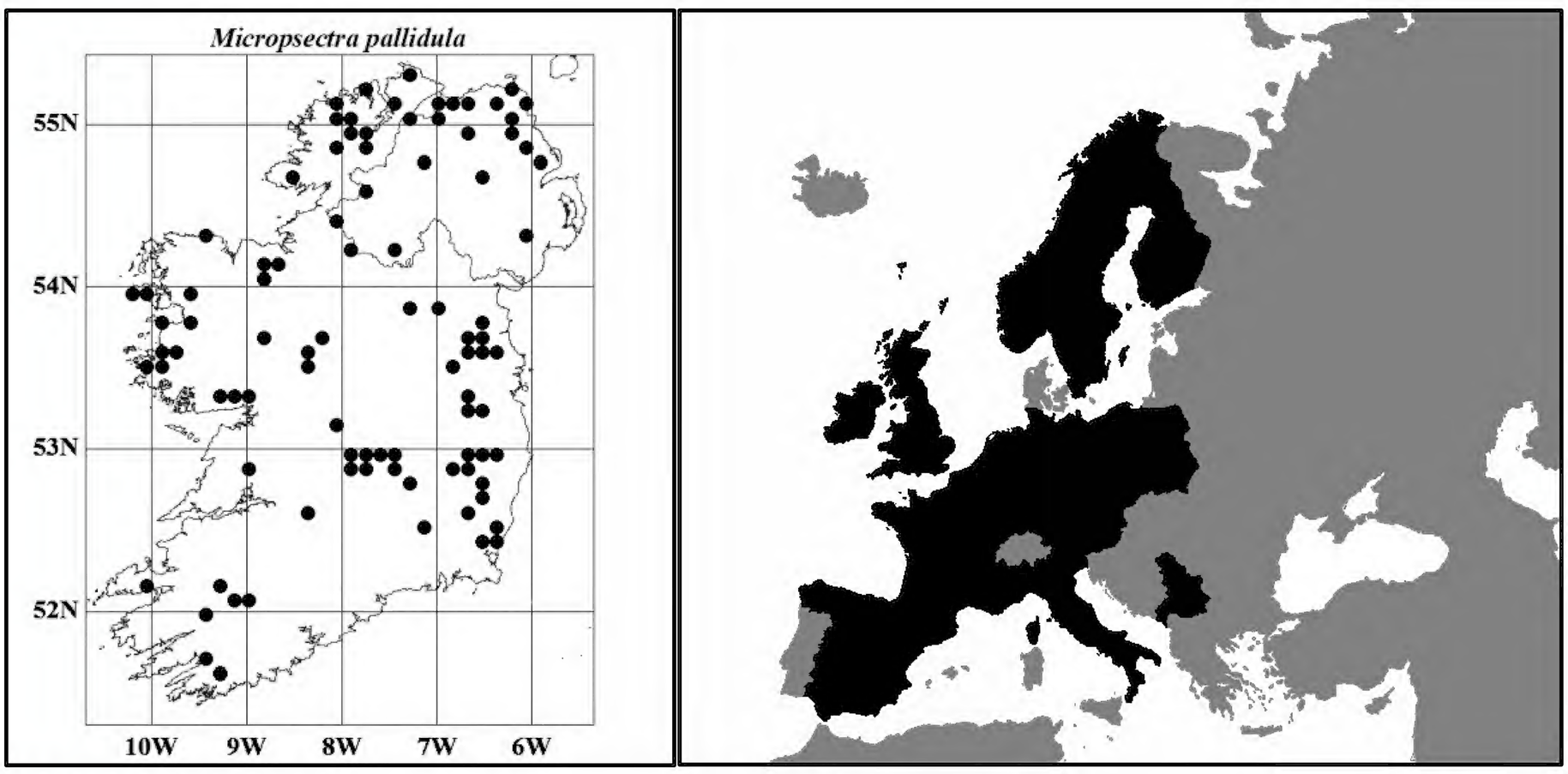
FIGURES 891-892. *Micropsectra logani* (Johannsen, 1928).



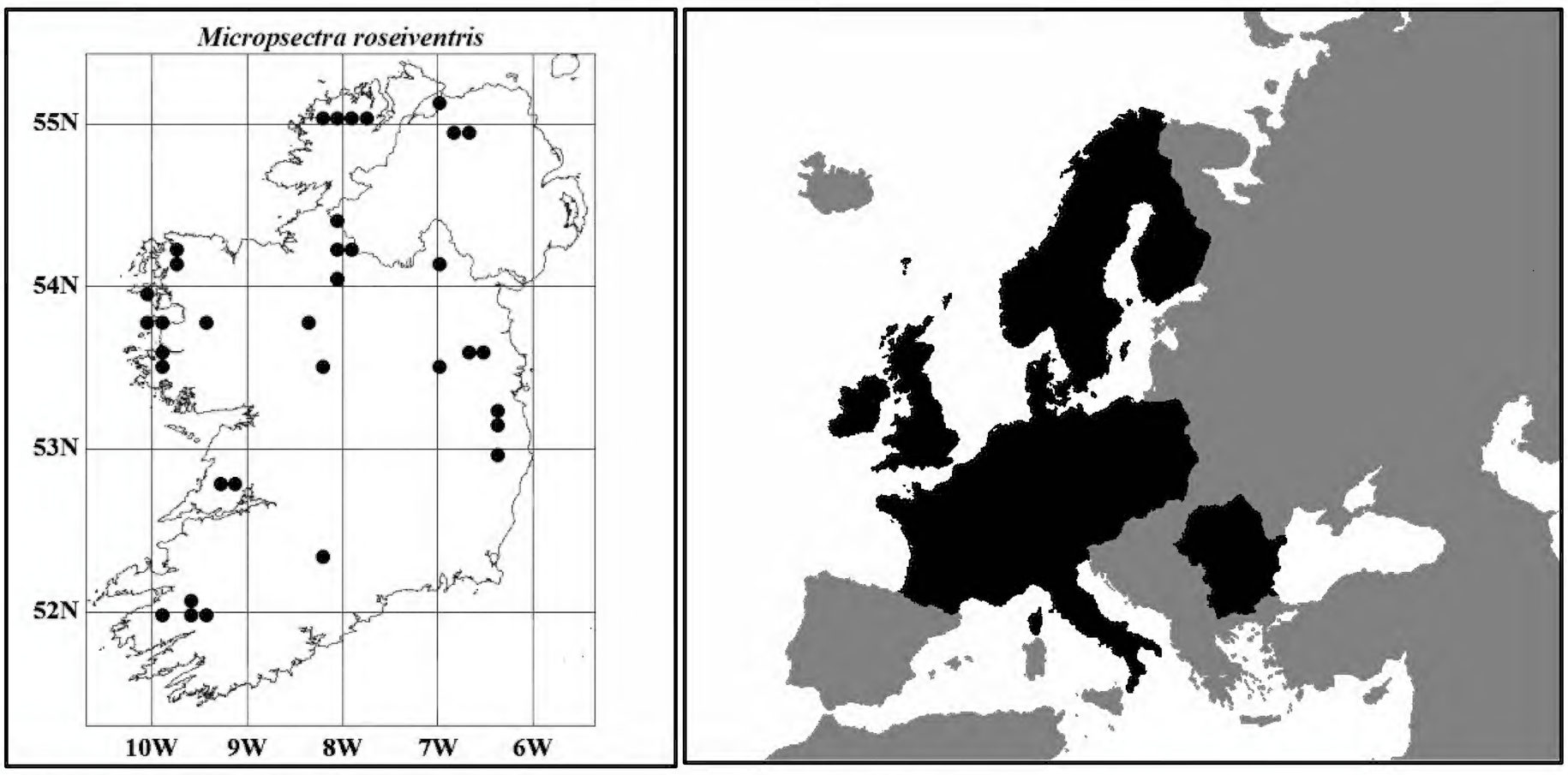
FIGURES 893-894. *Micropsectra nana* (Meigen, 1818).



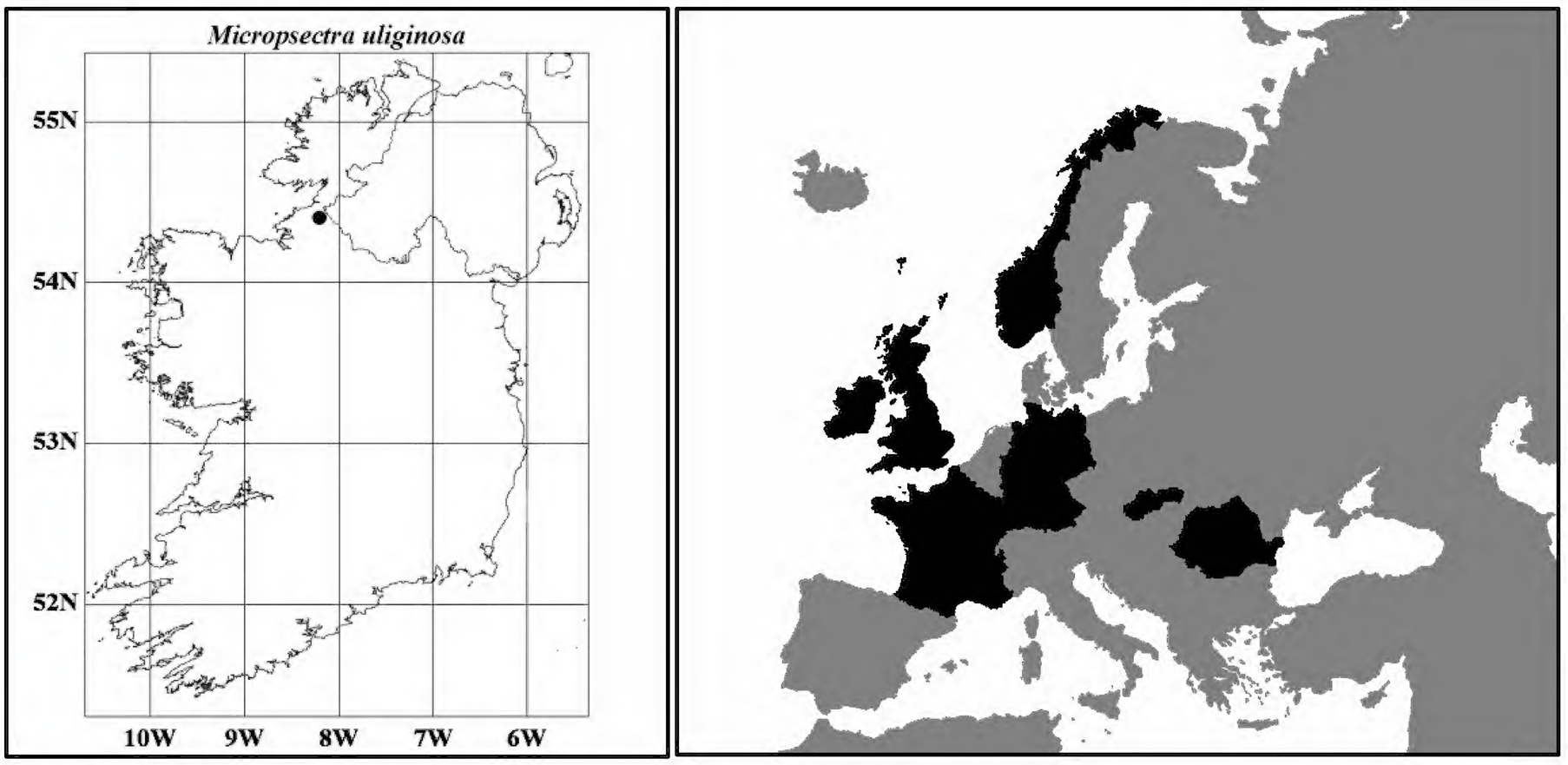
FIGURES 895-896. *Micropsectra notescens* (Walker, 1856).



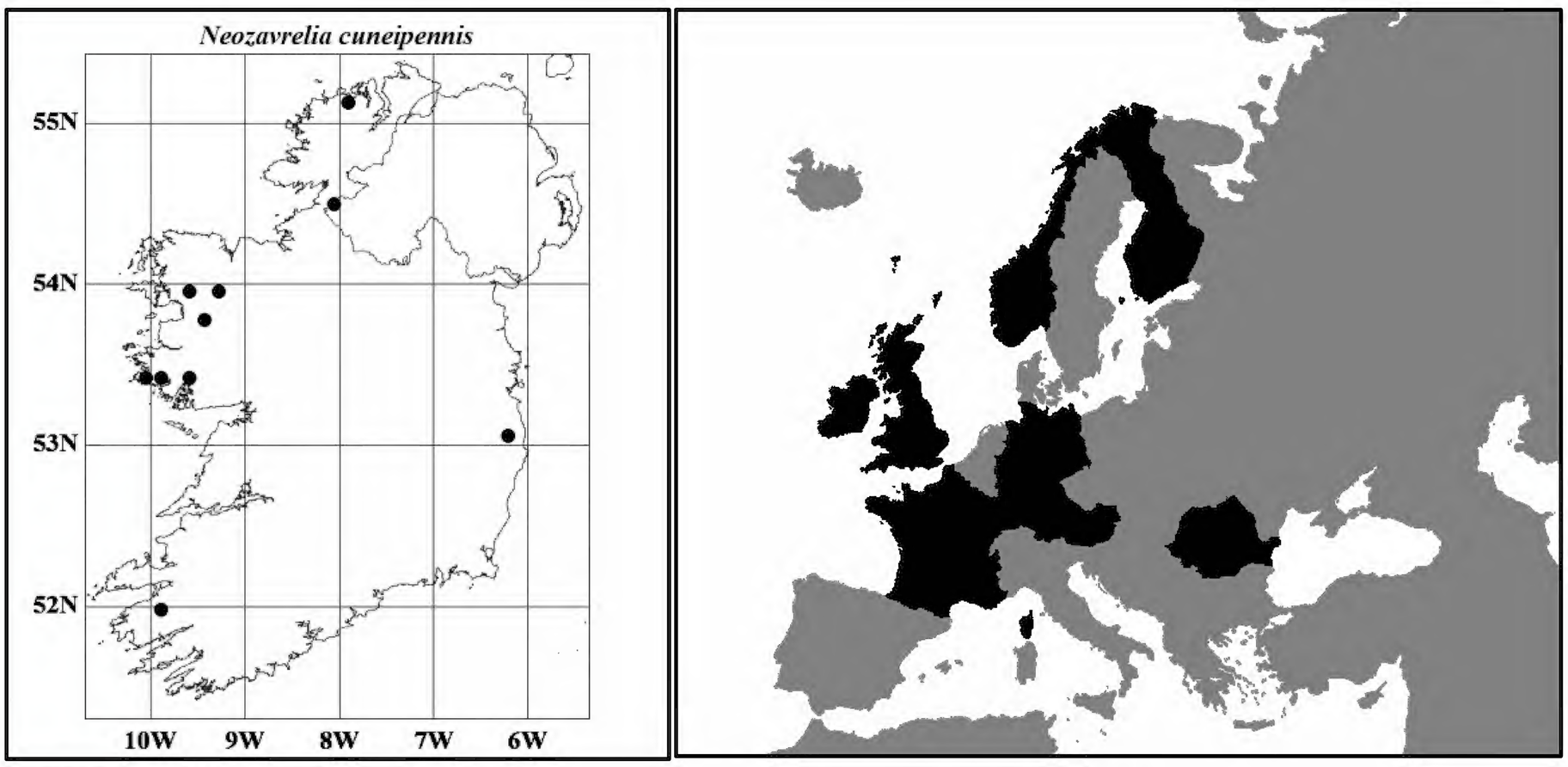
FIGURES 897-898. *Micropsectra pallidula* (Meigen, 1830).



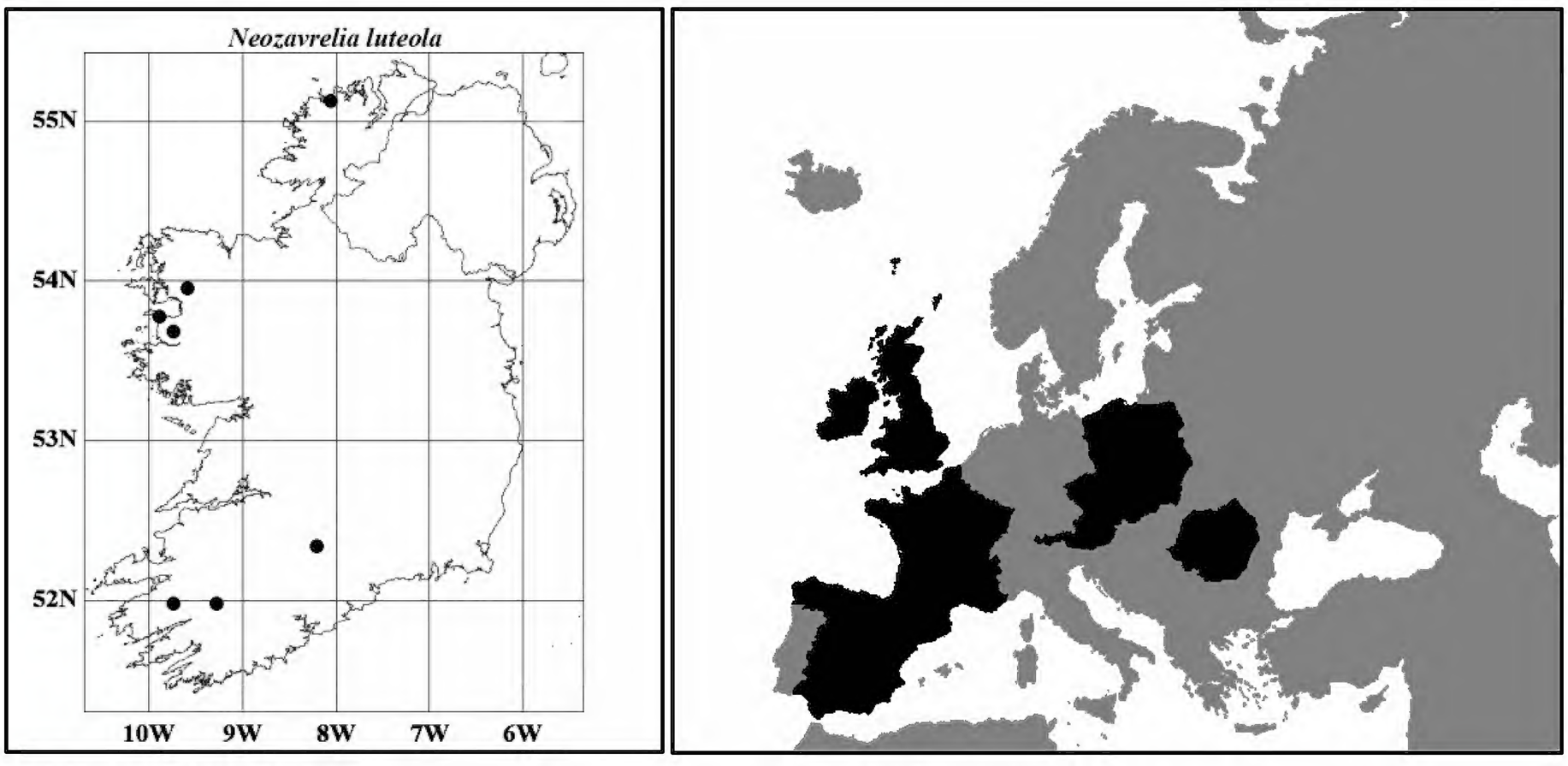
FIGURES 899-900. *Micropsectra roseiventris* (Kieffer, 1909).



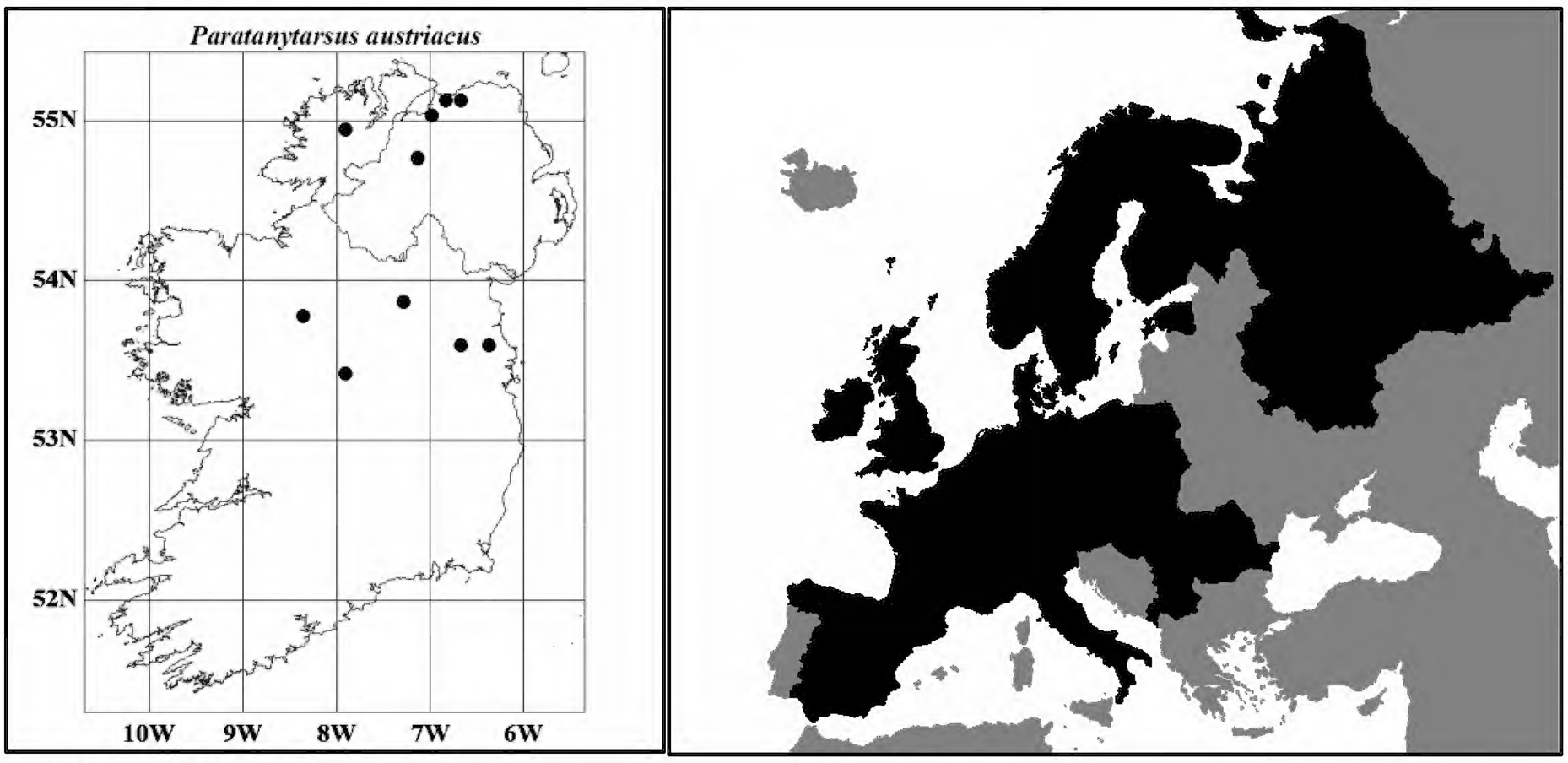
FIGURES 901-902. *Micropsectra uliginosa* (Reiss, 1969).



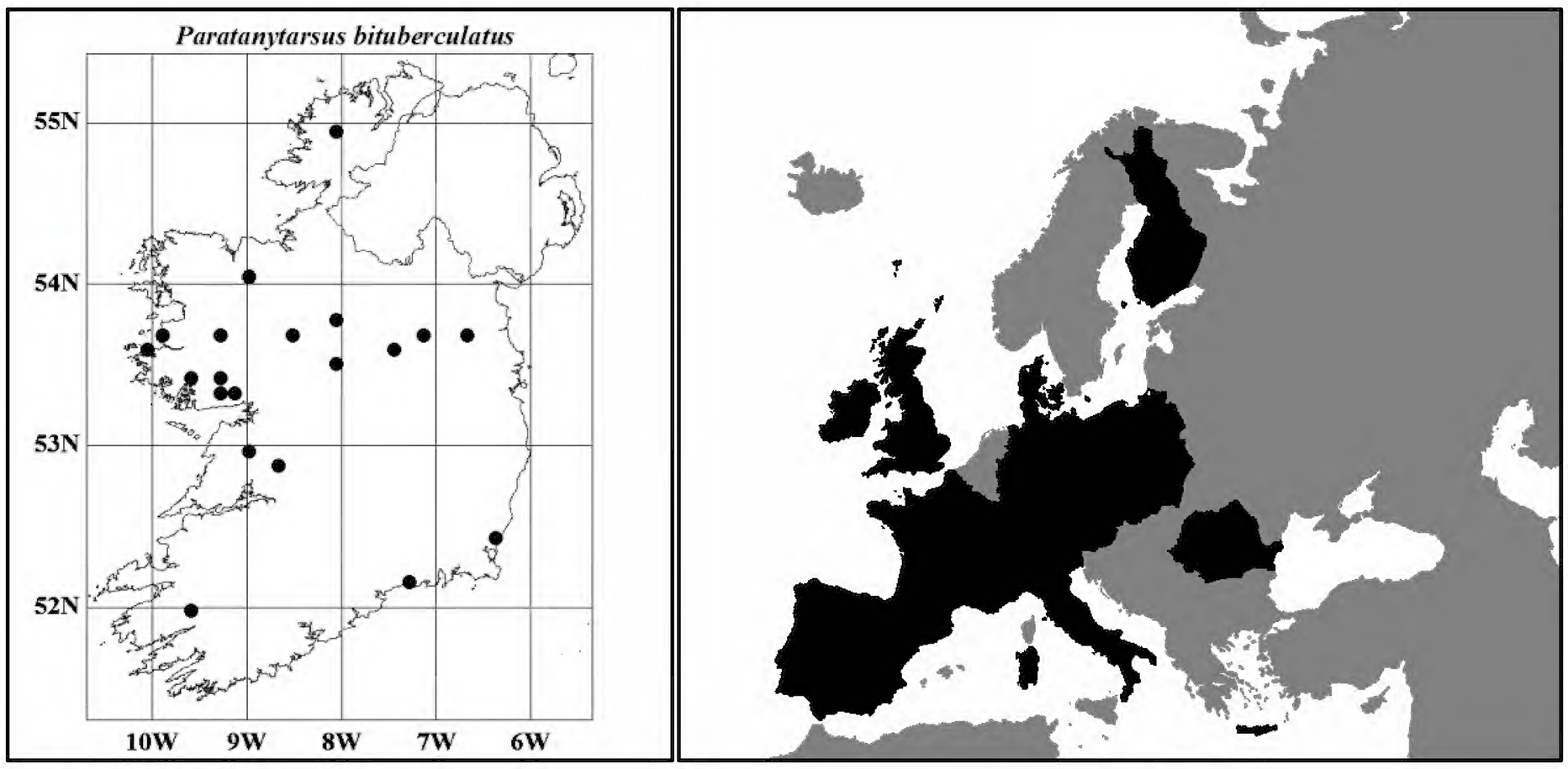
FIGURES 903-904. *Neozavrelia cuneipennis* (Edwards, 1929).



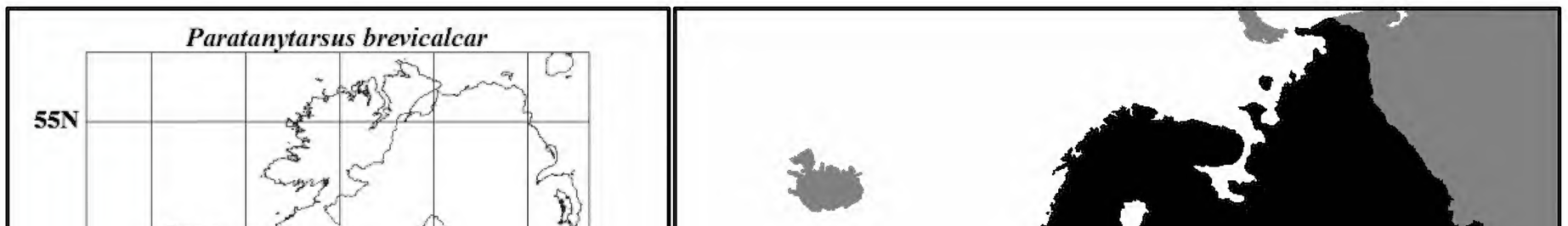
FIGURES 905-906. *Neozavrelia luteola* Goetghebuer & Thienemann, 1941.



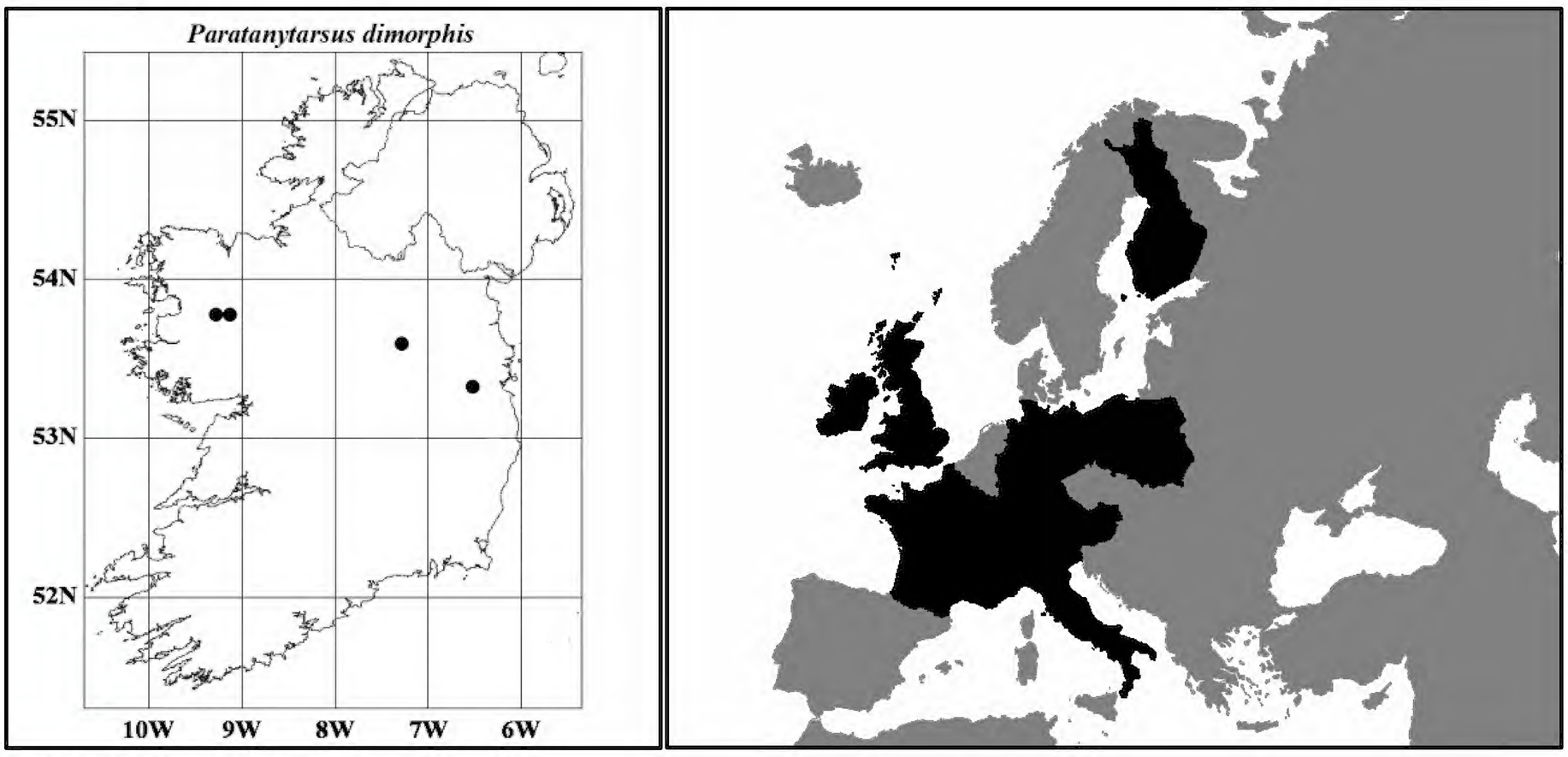
FIGURES 907-908. *Paratanytarsus austriacus* (Kieffer, 1924)



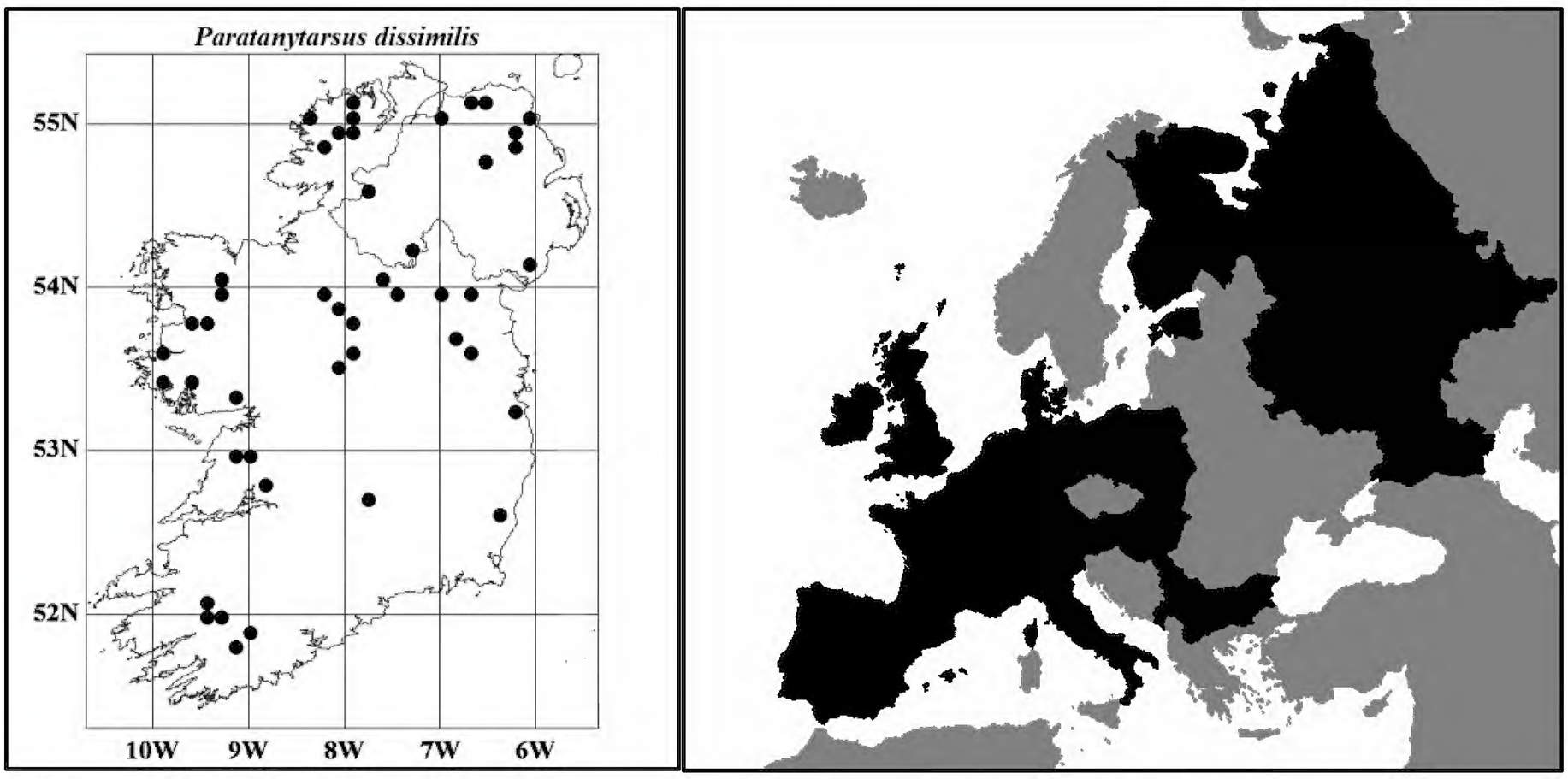
FIGURES 909-910. *Paratanytarsus bituberculatus* (Edwards, 1929).



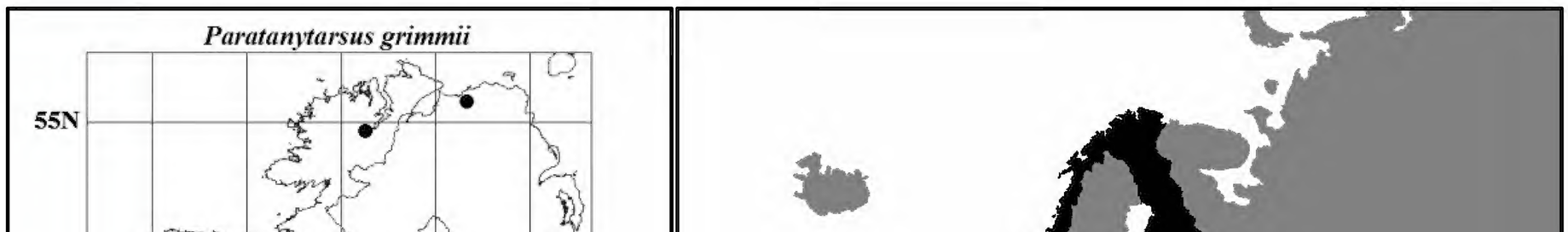
FIGURES 911-912. *Paratanytarsus brevicalcar* (Kieffer, 1909).



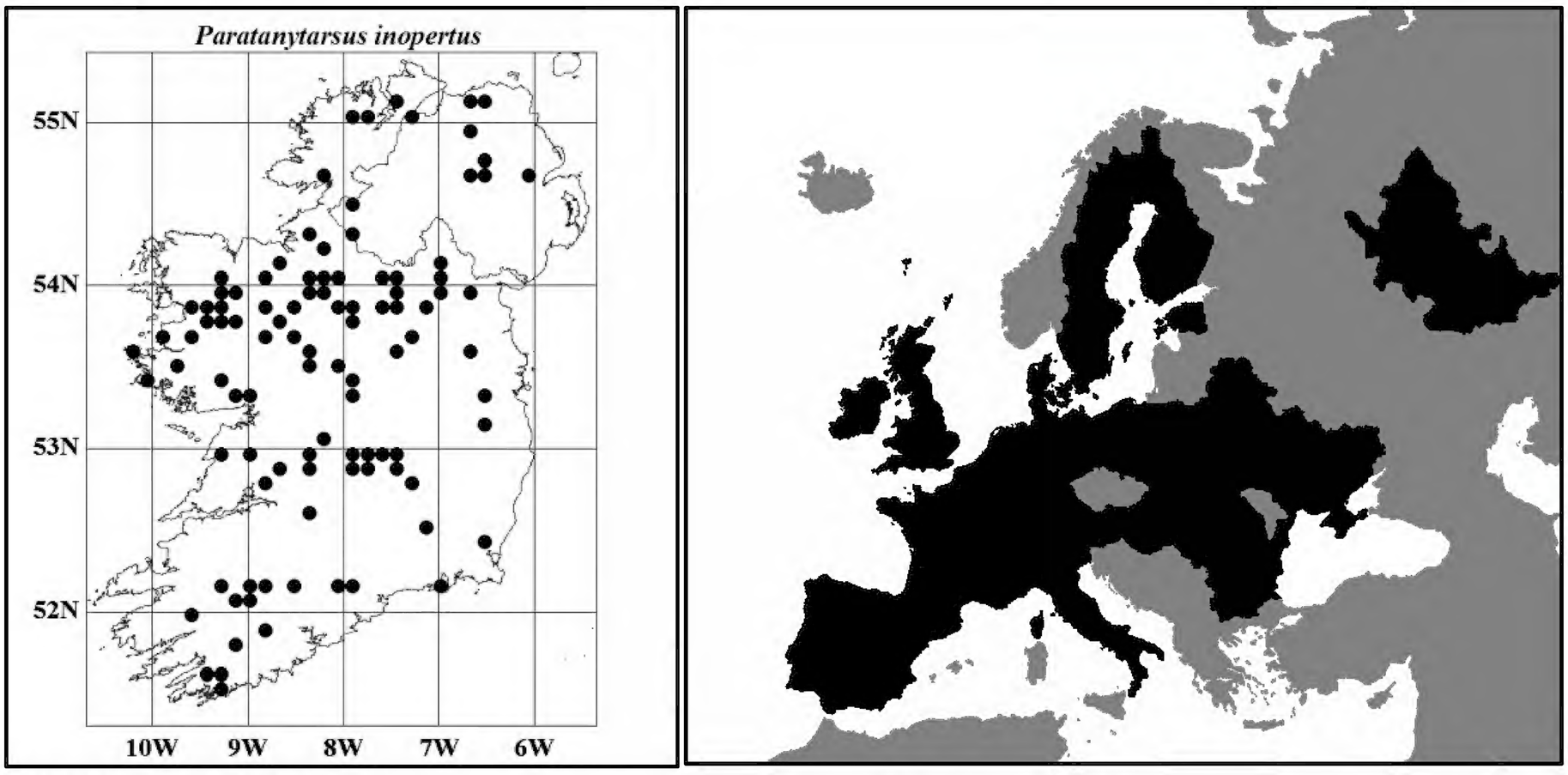
FIGURES 913-914. *Paratanytarsus dimorphis* Reiss, 1965.



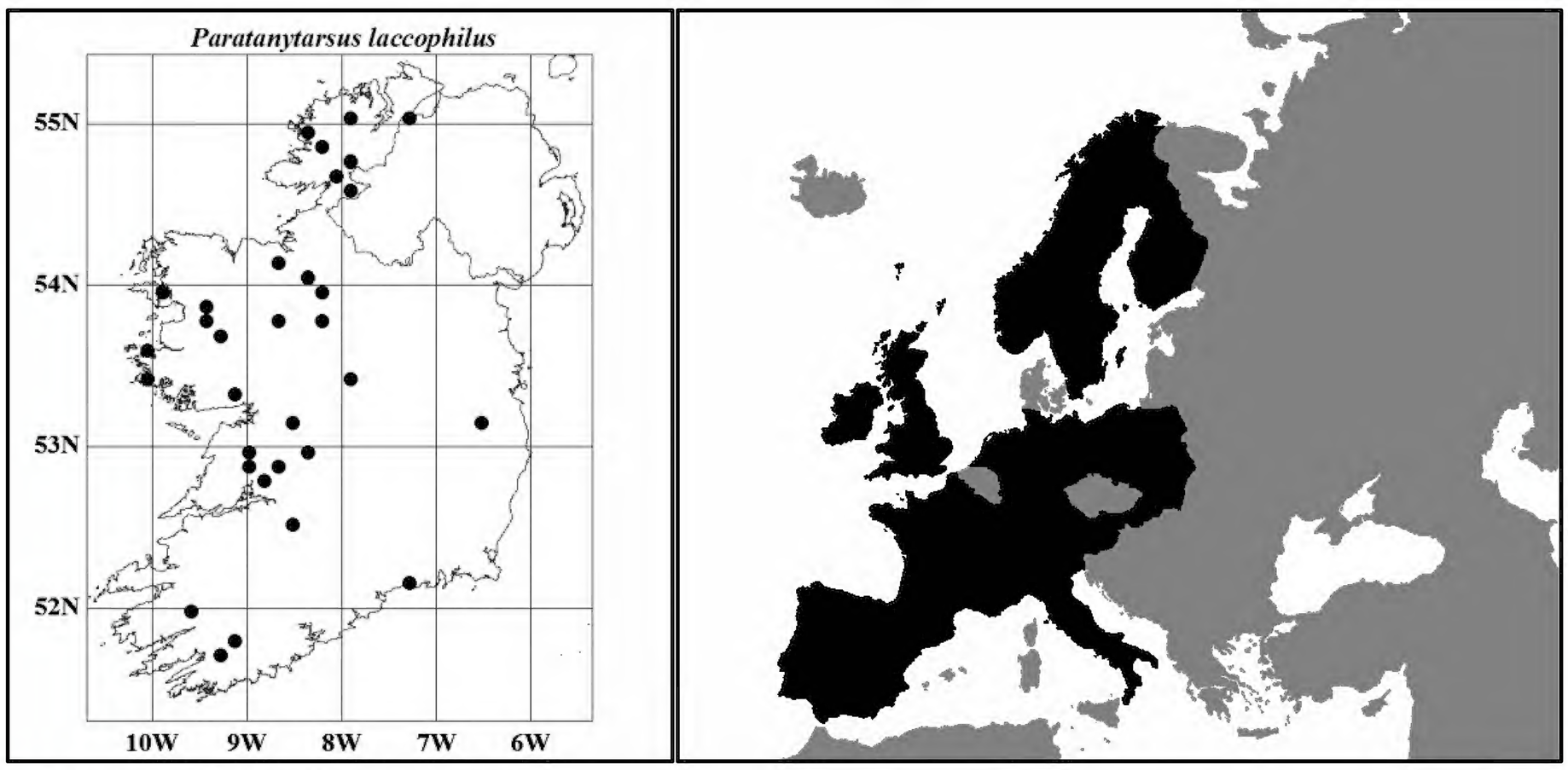
FIGURES 915-916. *Paratanytarsus dissimilis* (Johannsen, 1905).



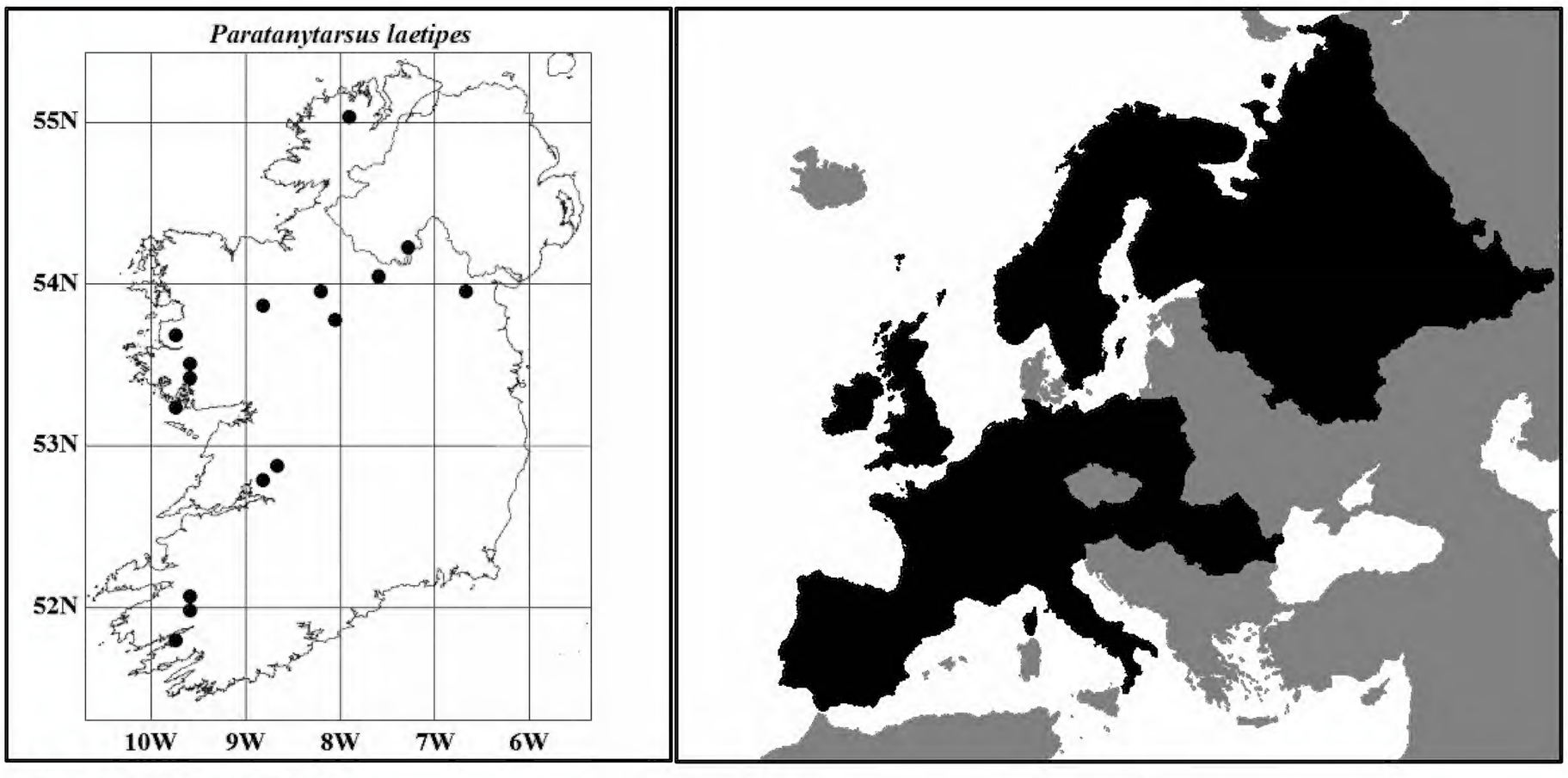
FIGURES 917-918. *Paratanytarsus grimmii* (Schneider, 1885).



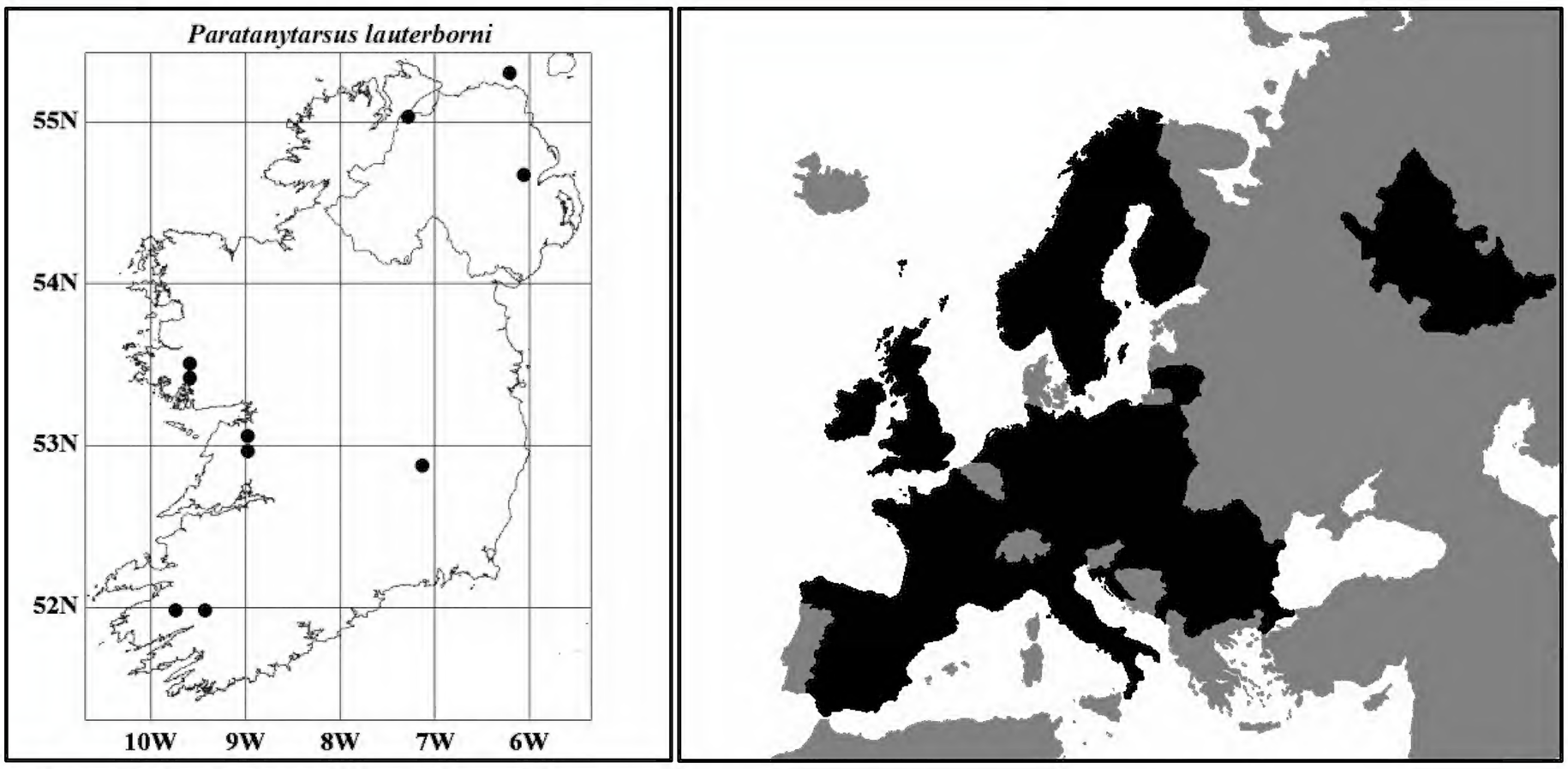
FIGURES 919-920. *Paratanytarsus inopertus* (Walker, 1856).



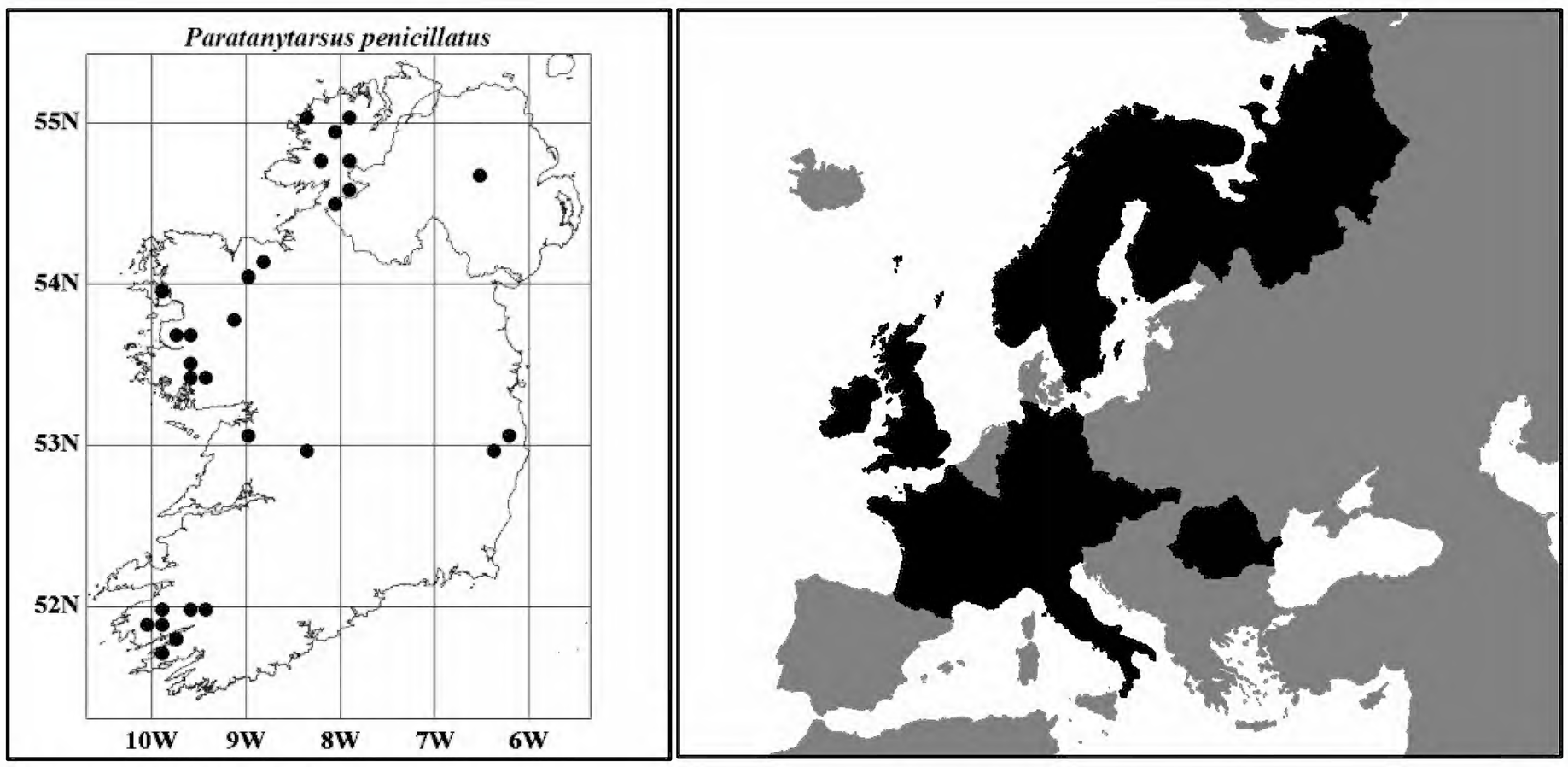
FIGURES 921-922. *Paratanytarsus laccophilus* (Edwards, 1929).



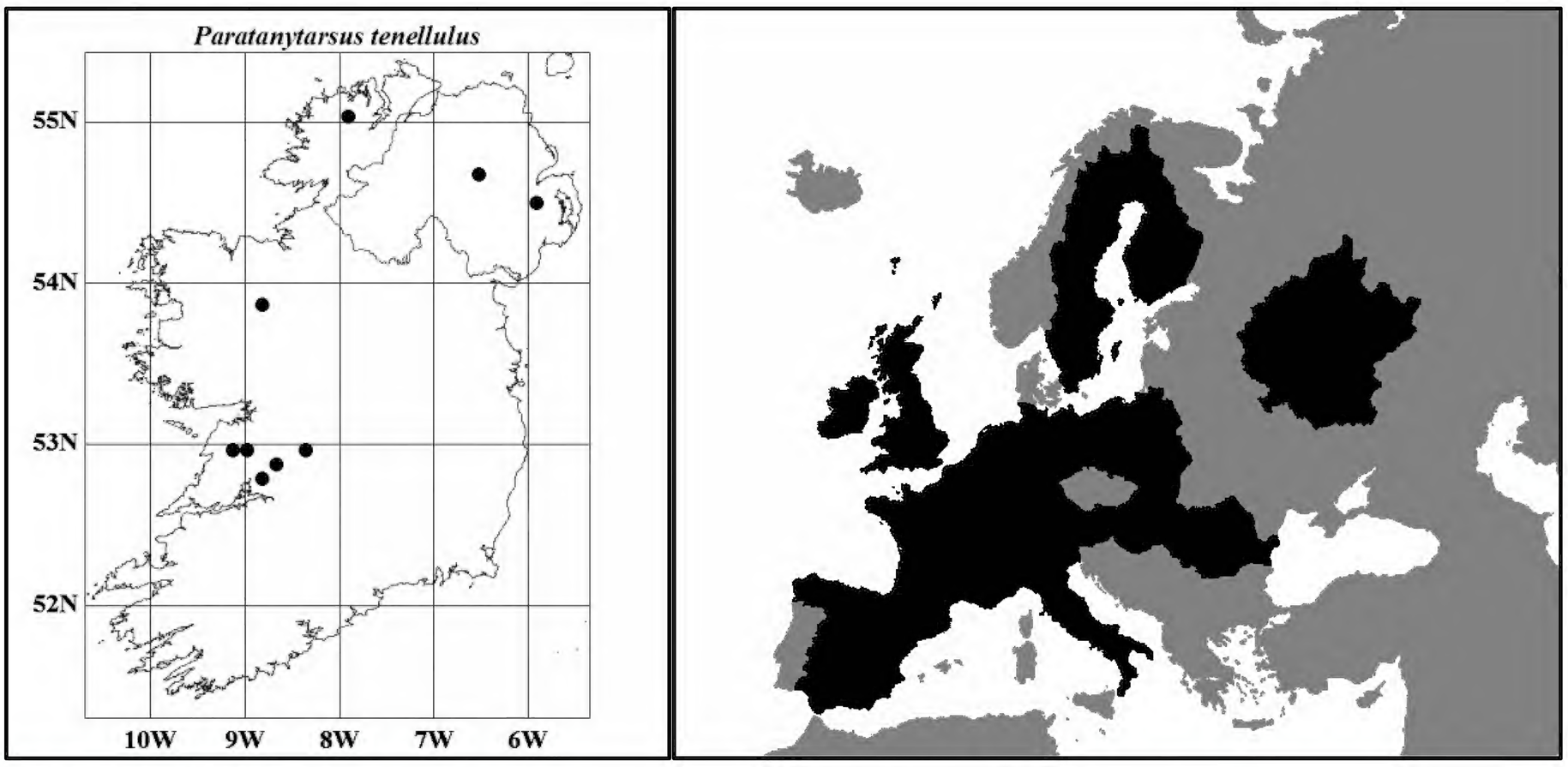
FIGURES 923-924. *Paratanytarsus laetipes* (Zetterstedt, 1850).



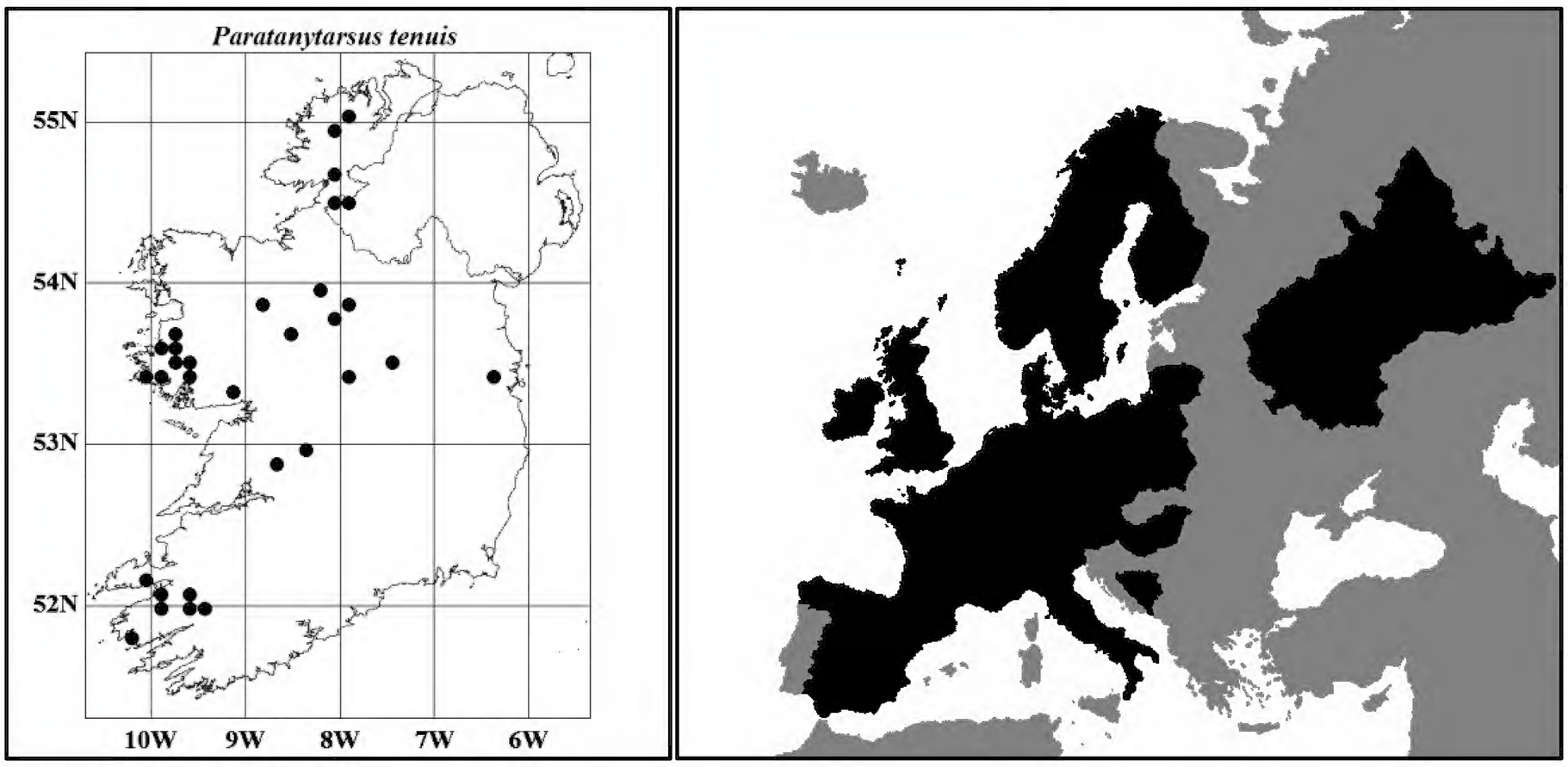
FIGURES 925-926. *Paratanytarsus lauterborni* (Kieffer, 1909).



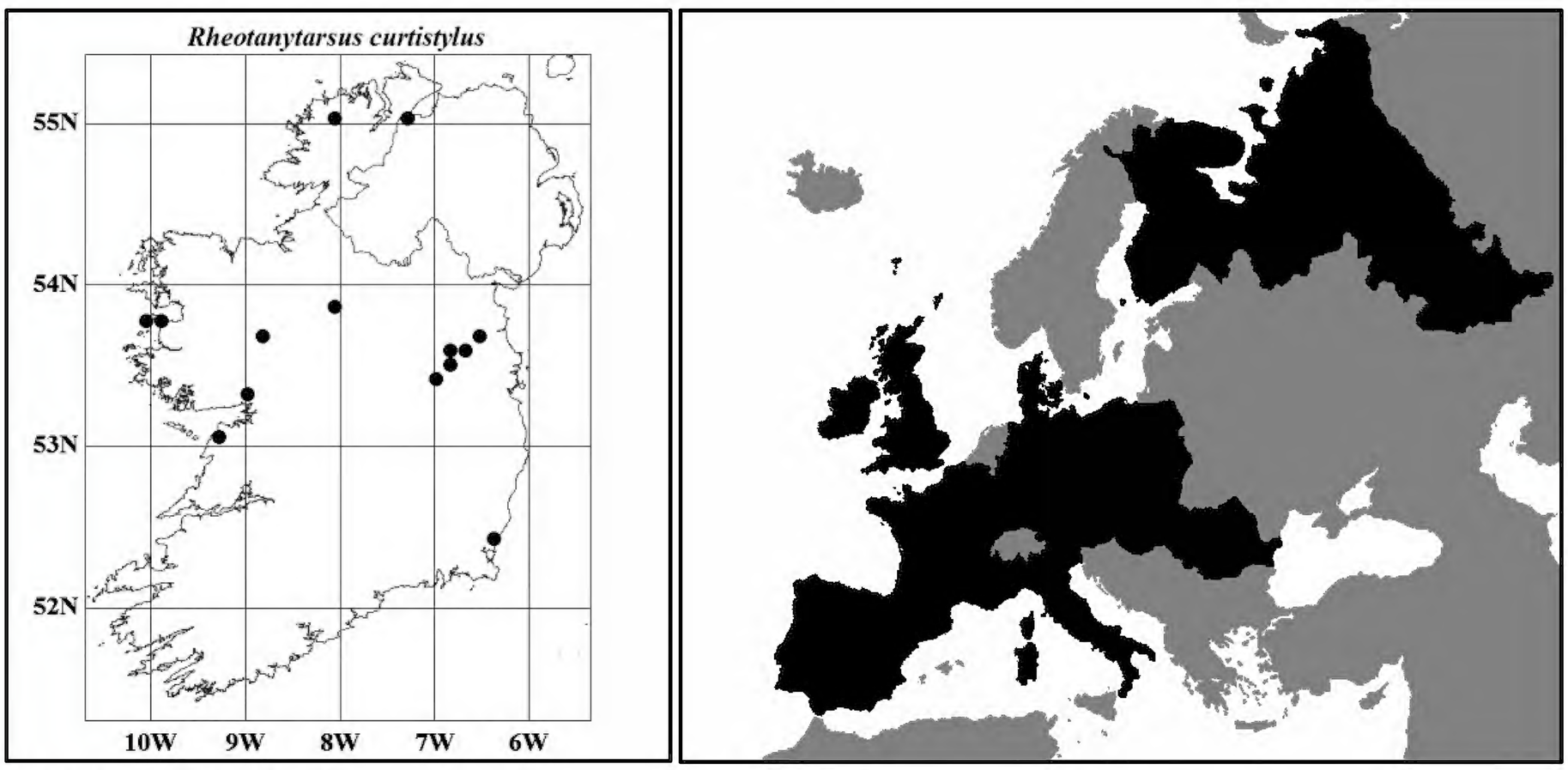
FIGURES 927-928. *Paratanytarsus penicillatus* (Goetghebuer, 1928).



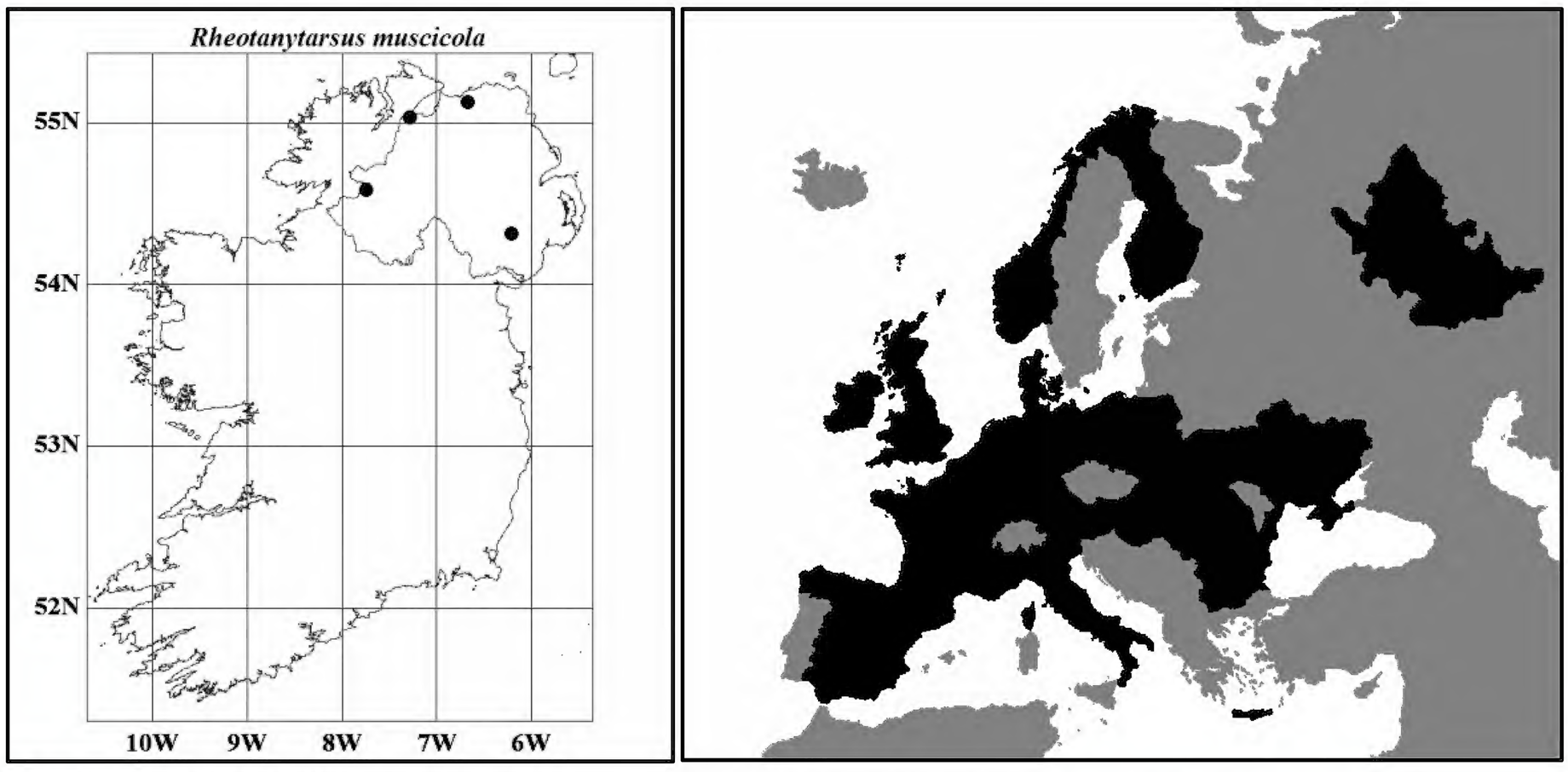
FIGURES 929-930. *Paratanytarsus tenellulus* (Goetghebuer, 1921).



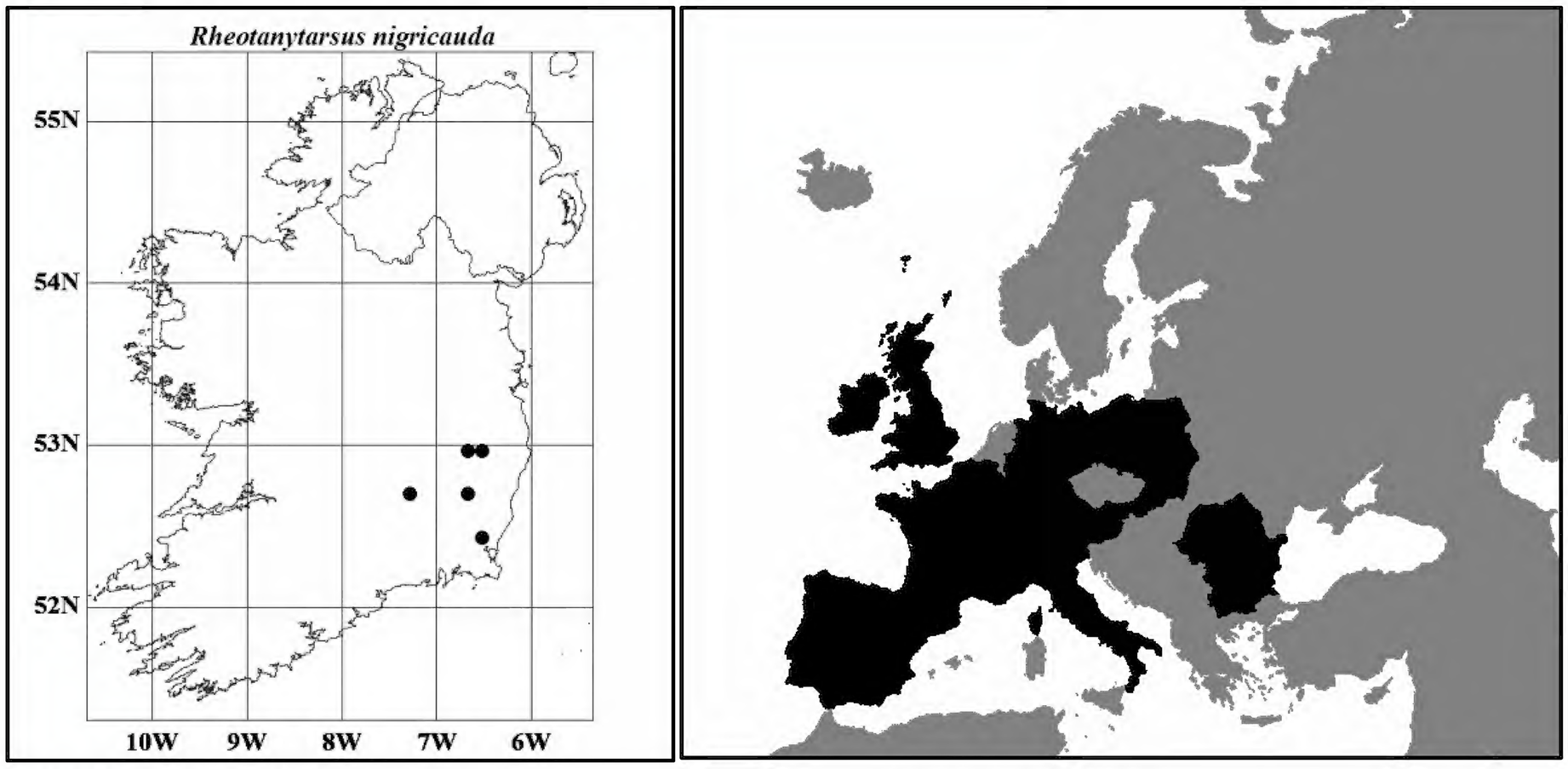
FIGURES 931-932. *Paratanytarsus tenuis* (Meigen, 1830).



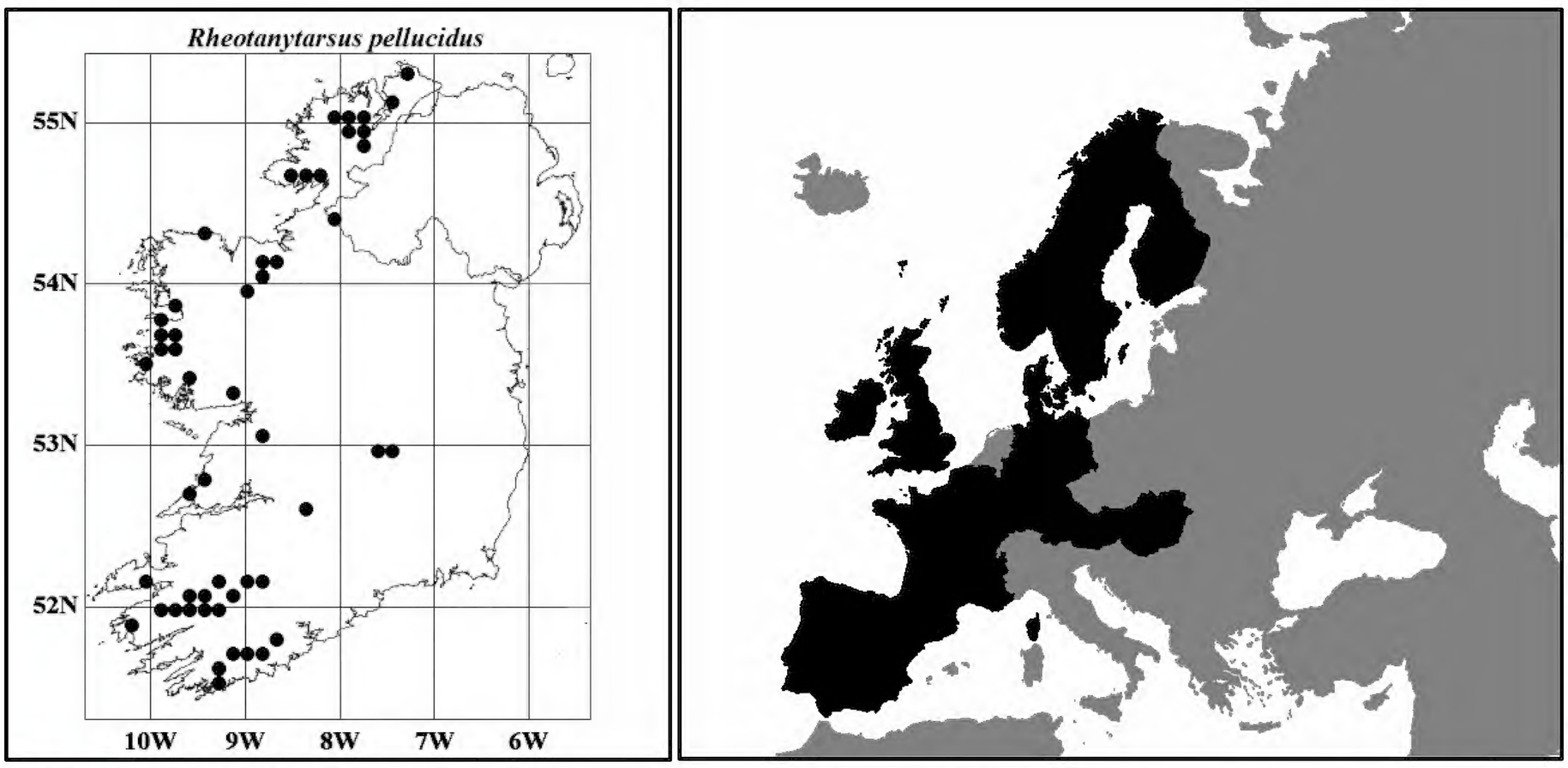
FIGURES 933-934. *Rheotanytarsus curtistylus* (Goetghebuer, 1921).



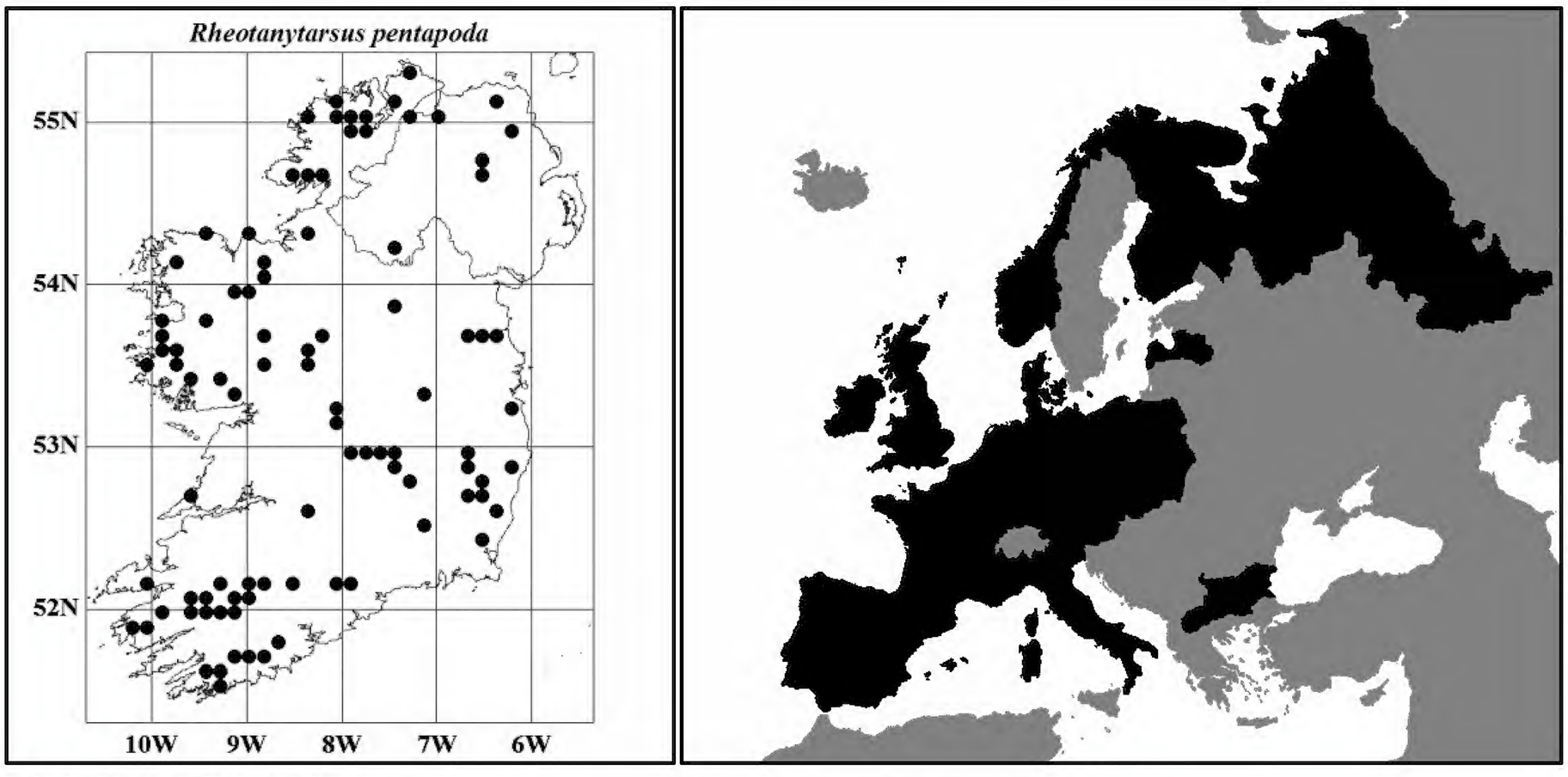
FIGURES 935-936. *Rheotanytarsus muscicola* Thienemann, 1929.



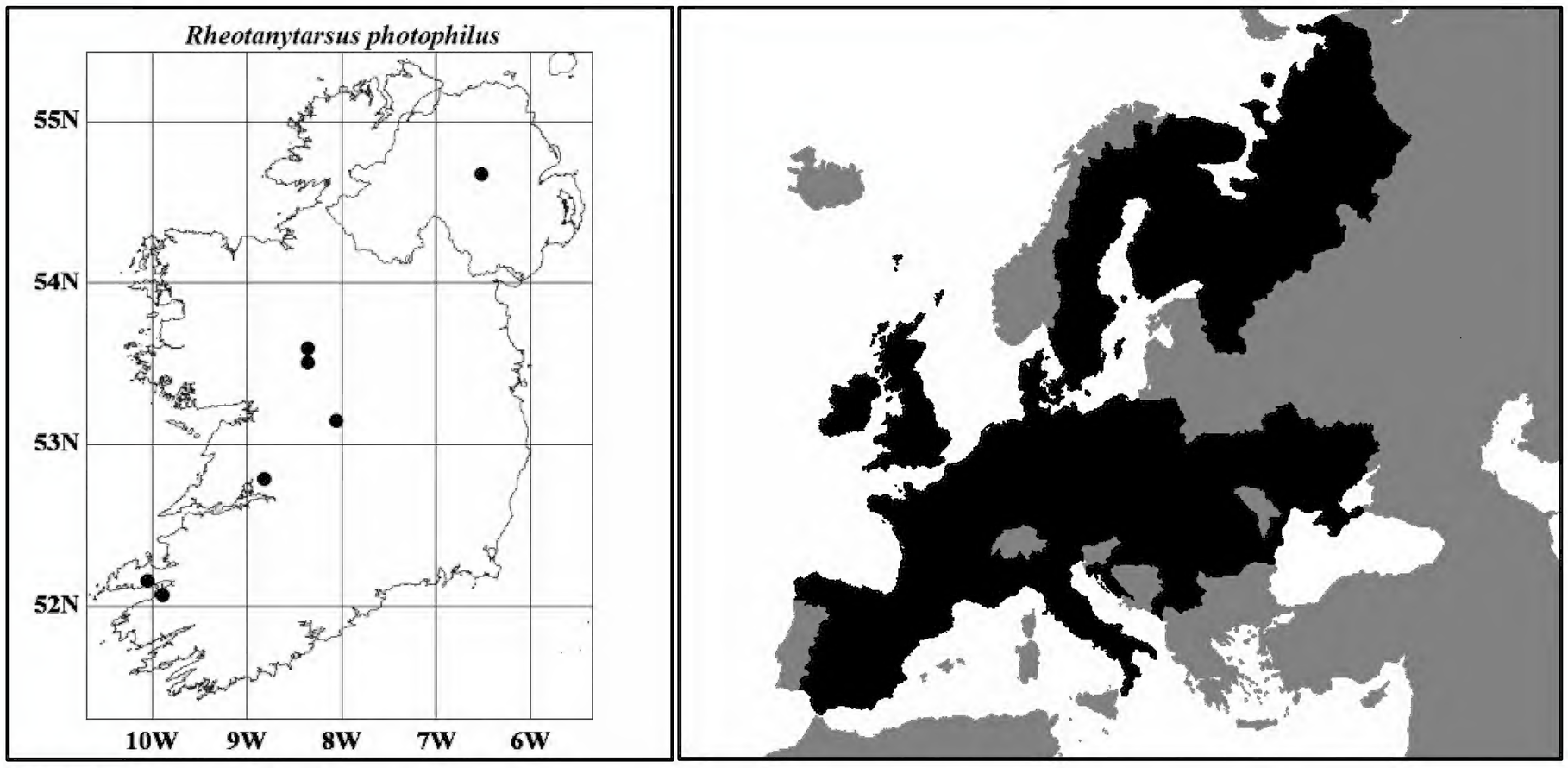
FIGURES 937-938. *Rheotanytarsus nigricauda* Fittkau, 1960.



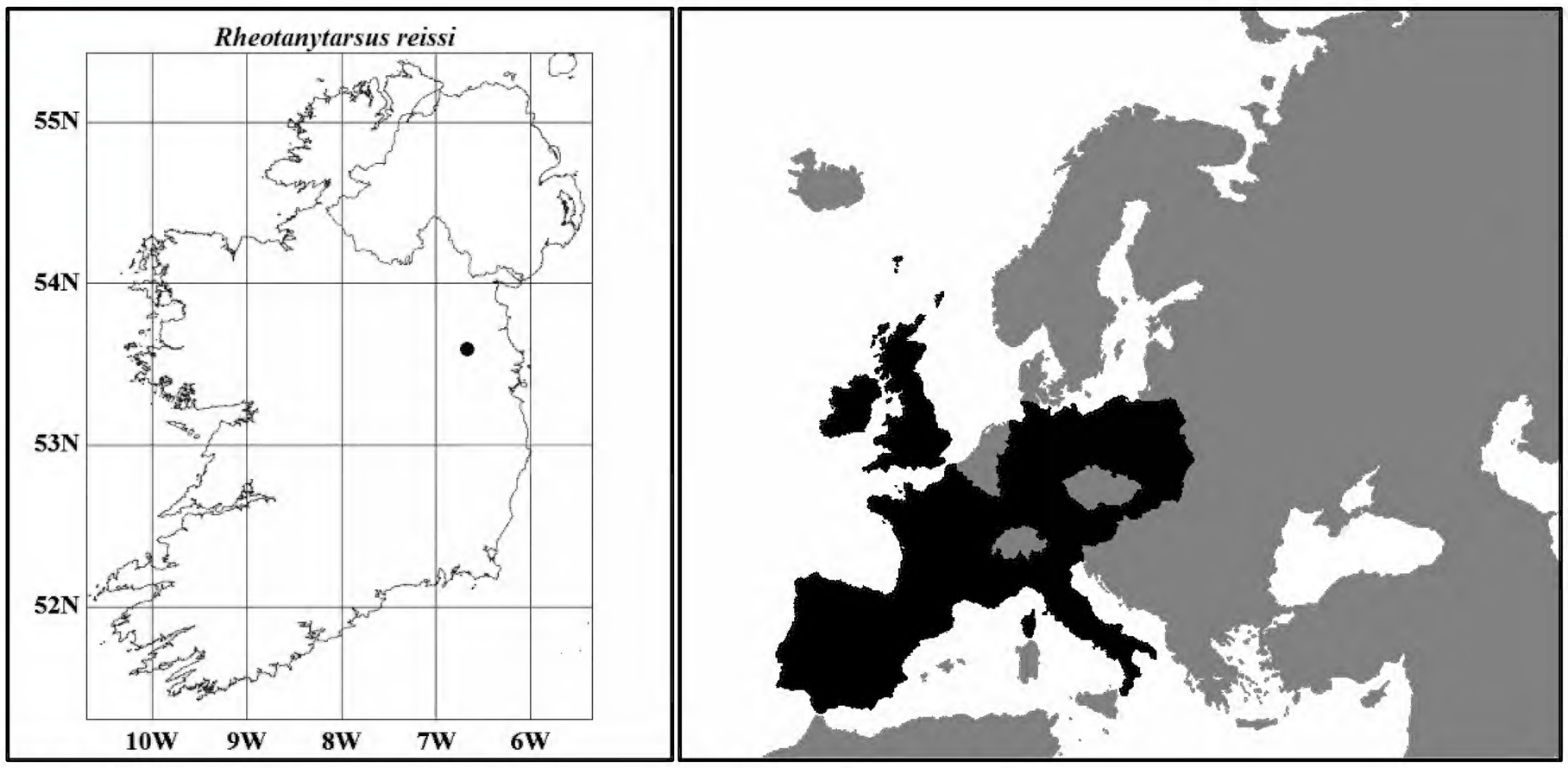
FIGURES 939-940. *Rheotanytarsus pellucidus* (Walker, 1848).



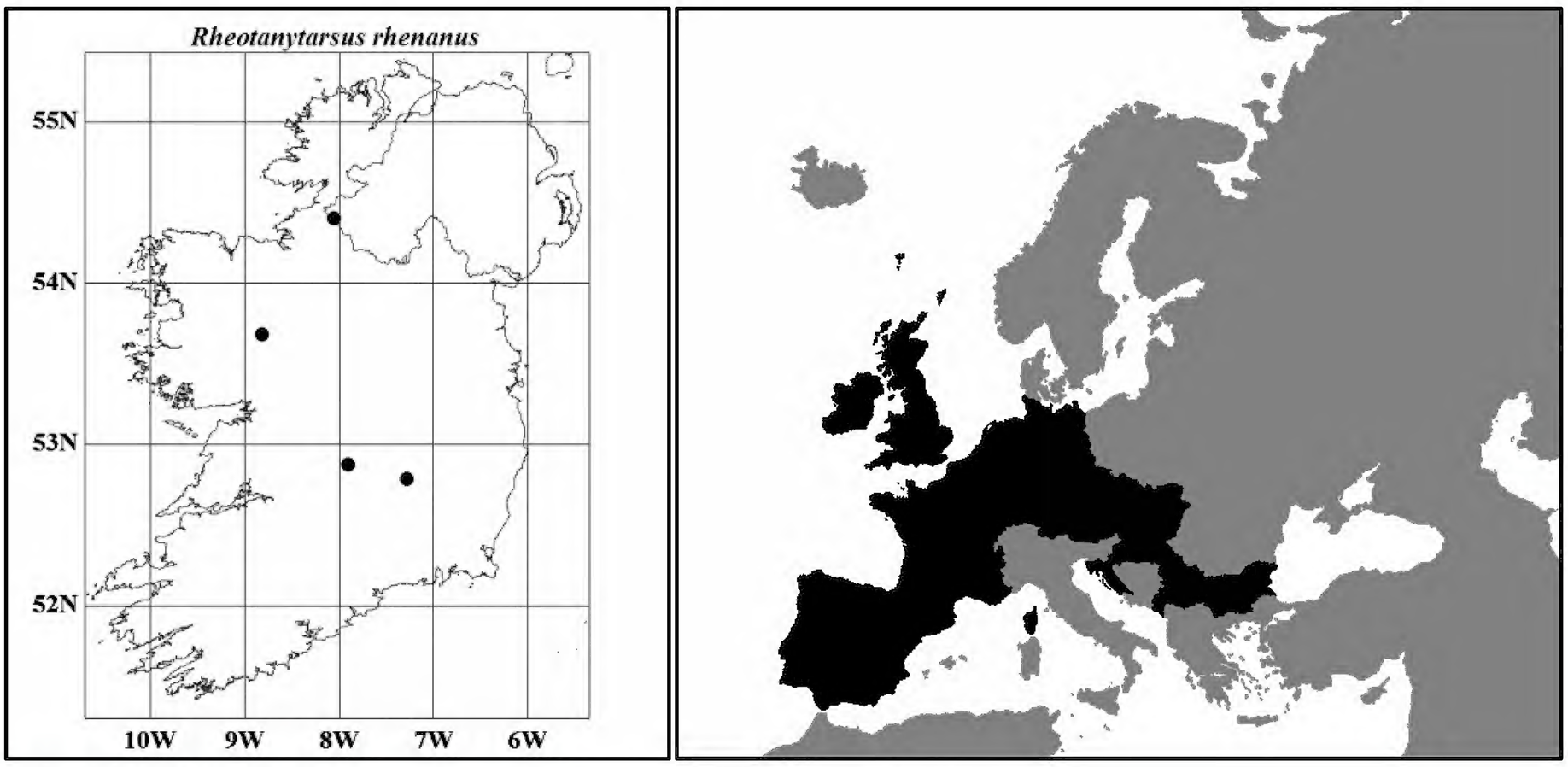
FIGURES 941-942. *Rheotanytarsus pentapoda* (Kieffer, 1909).



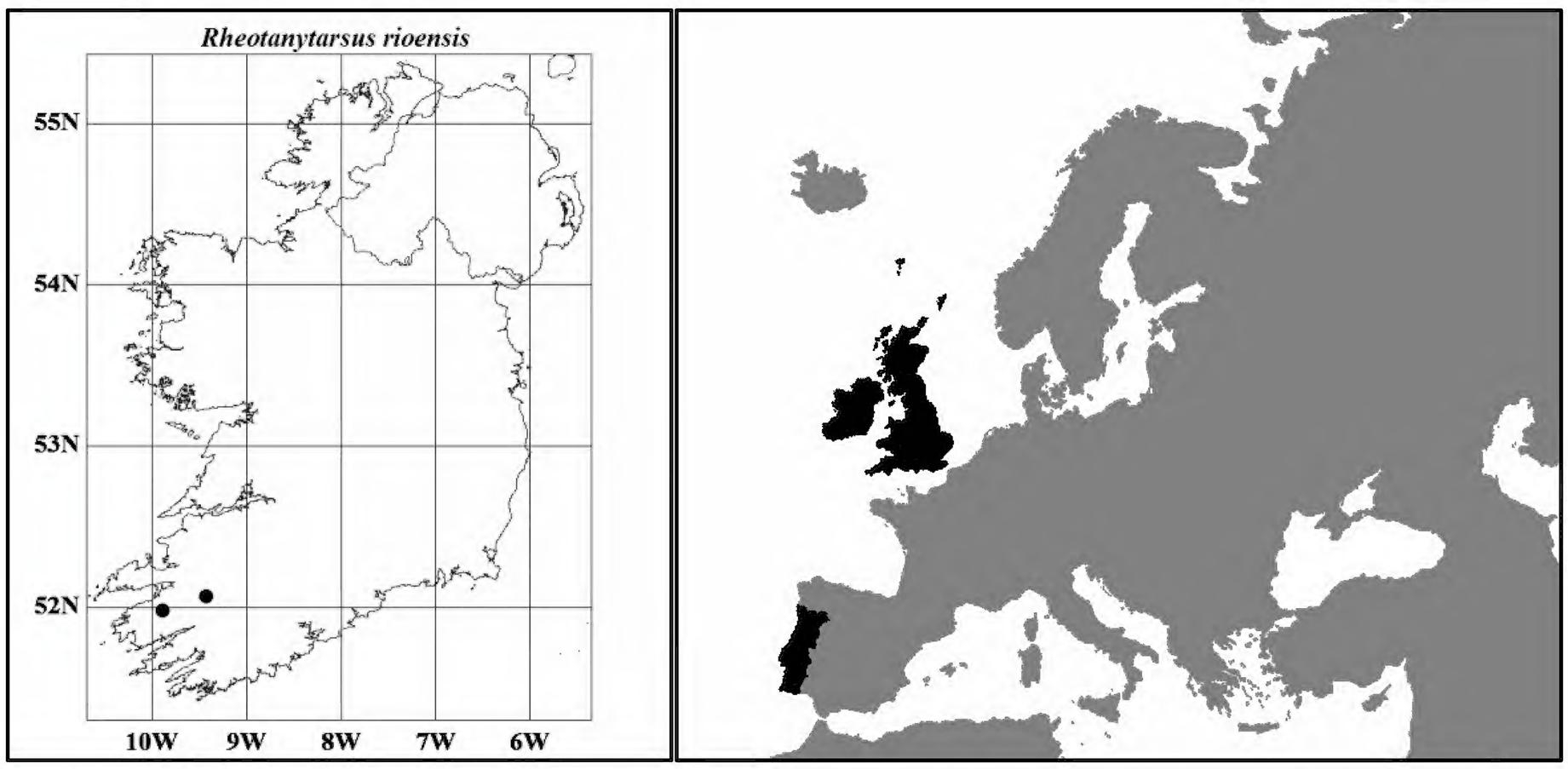
FIGURES 943-944. *Rheotanytarsus photophilus* (Goetghebuer, 1921).



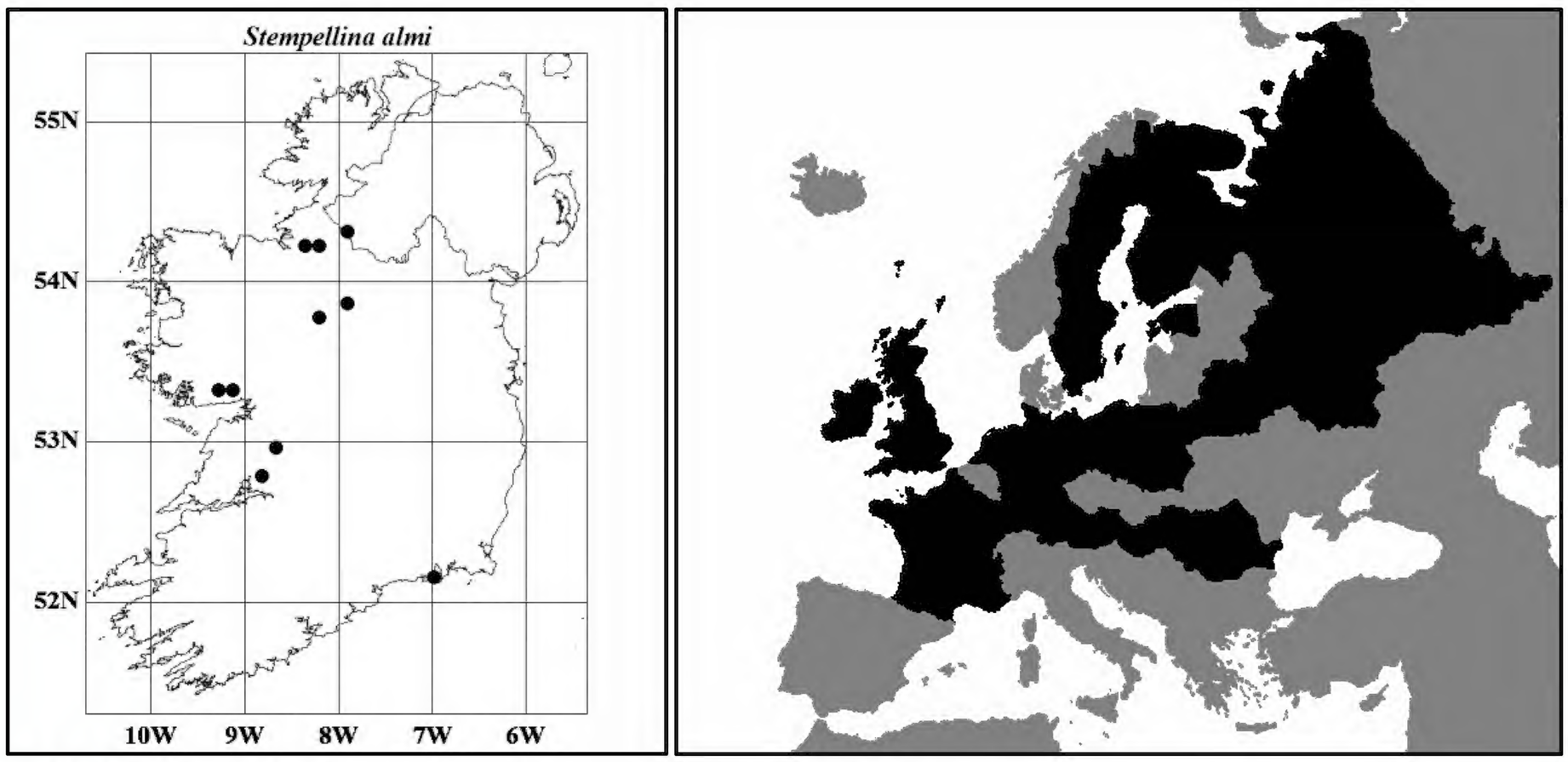
FIGURES 945-946. *Rheotanytarsus reissi* Lehmann, 1970.



FIGURES 947-948. *Rheotanytarsus rhenanus* Klink, 1983.

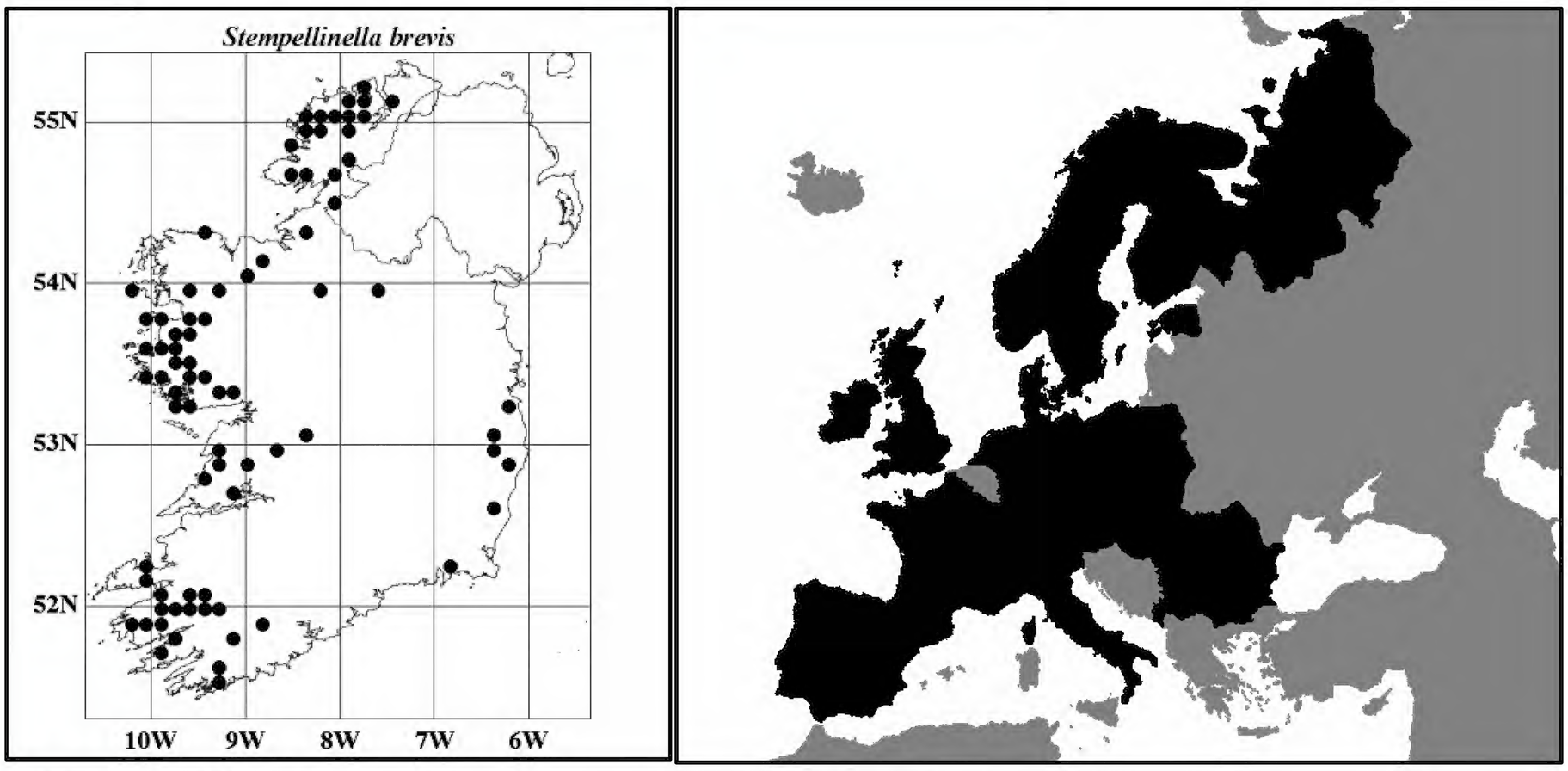


FIGURES 949-950. *Rheotanytarsus rioensis* Langton & Armitage, 1995.

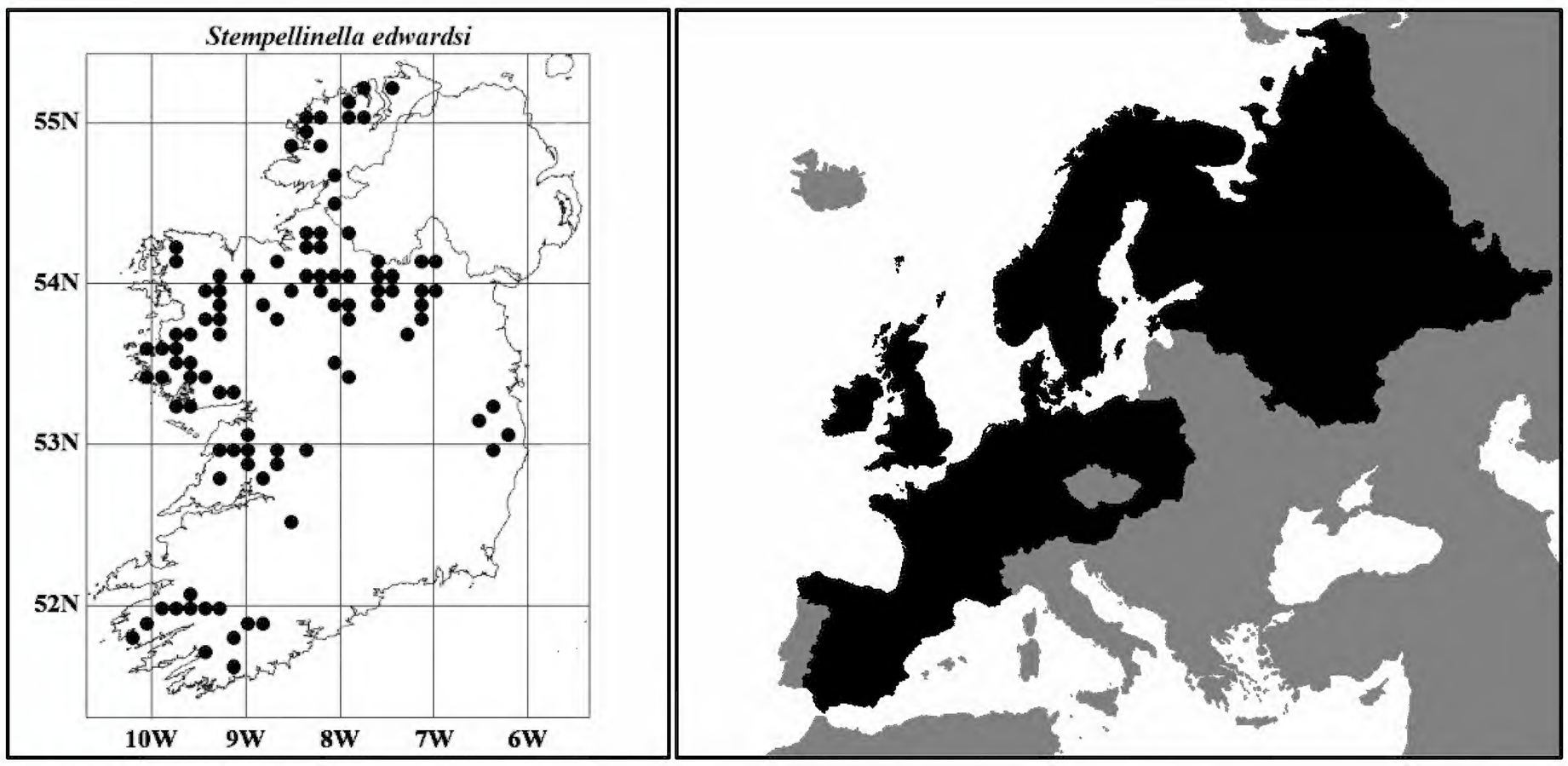


FIGURES 951-952. *Stempellina almi* Brundin, 1947.

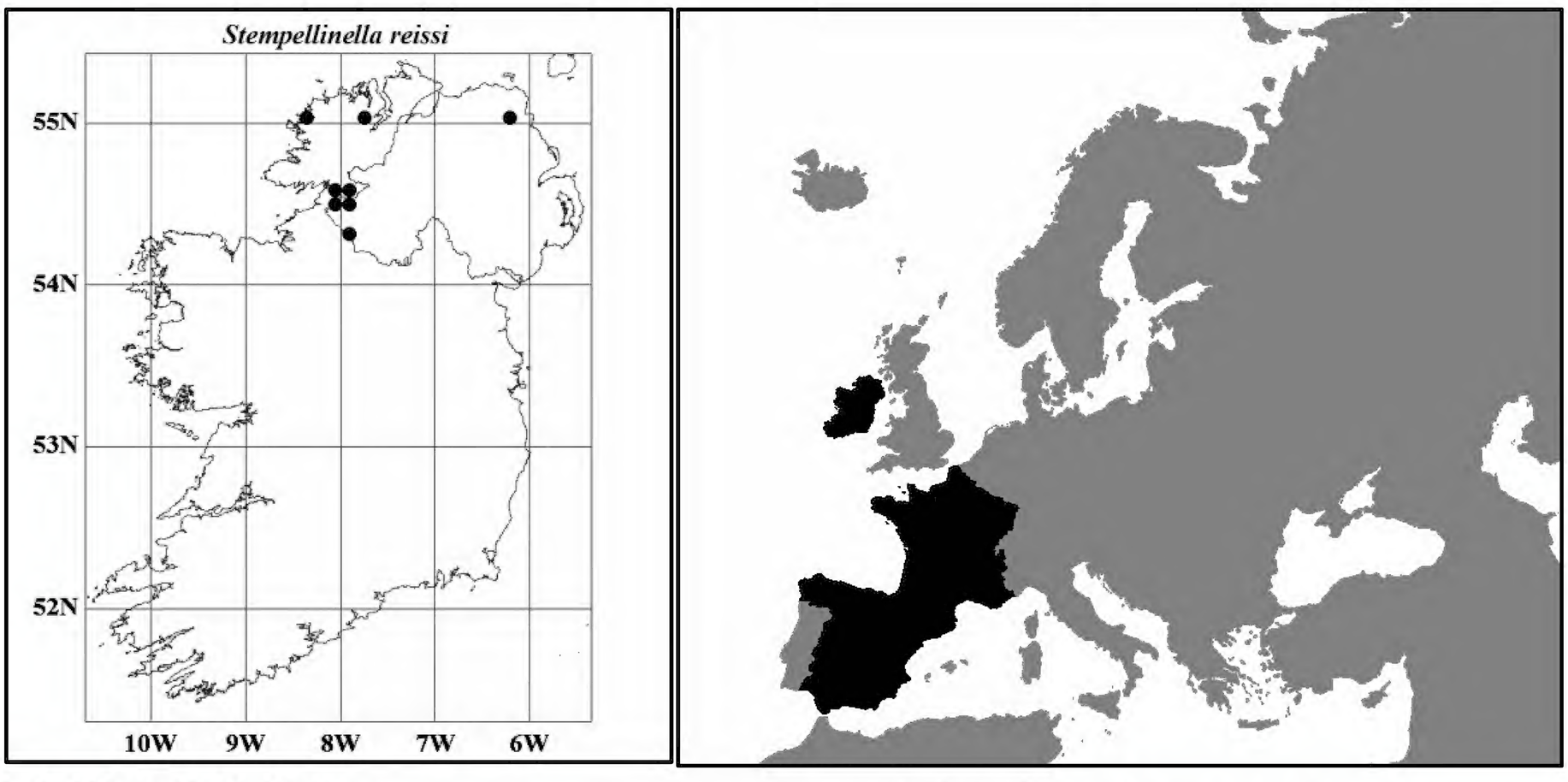
FIGURES 953-954. *Stempellina bausei* (Kieffer, 1911).



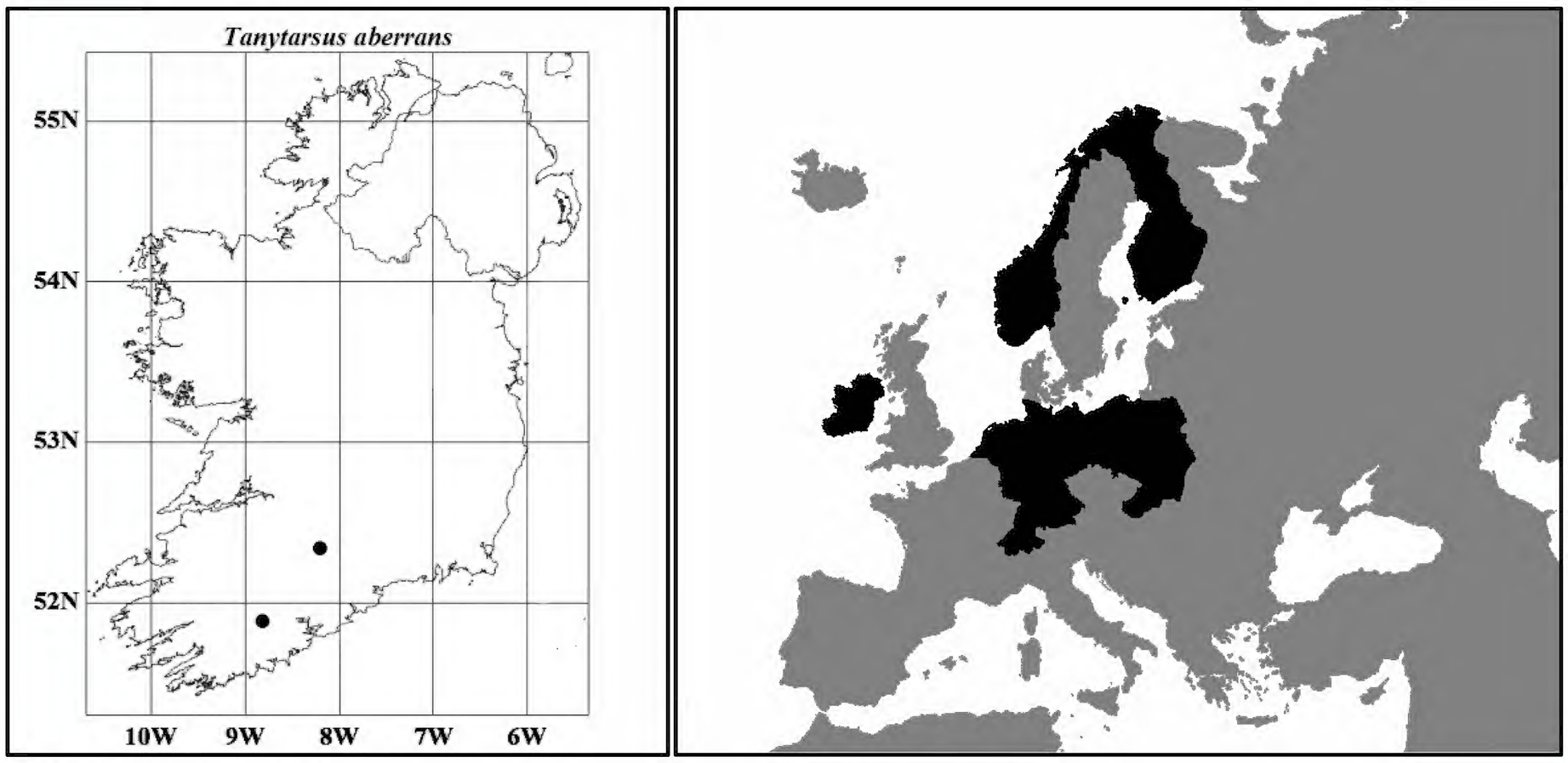
FIGURES 955-956. *Stempellinella brevis* (Edwards, 1929).



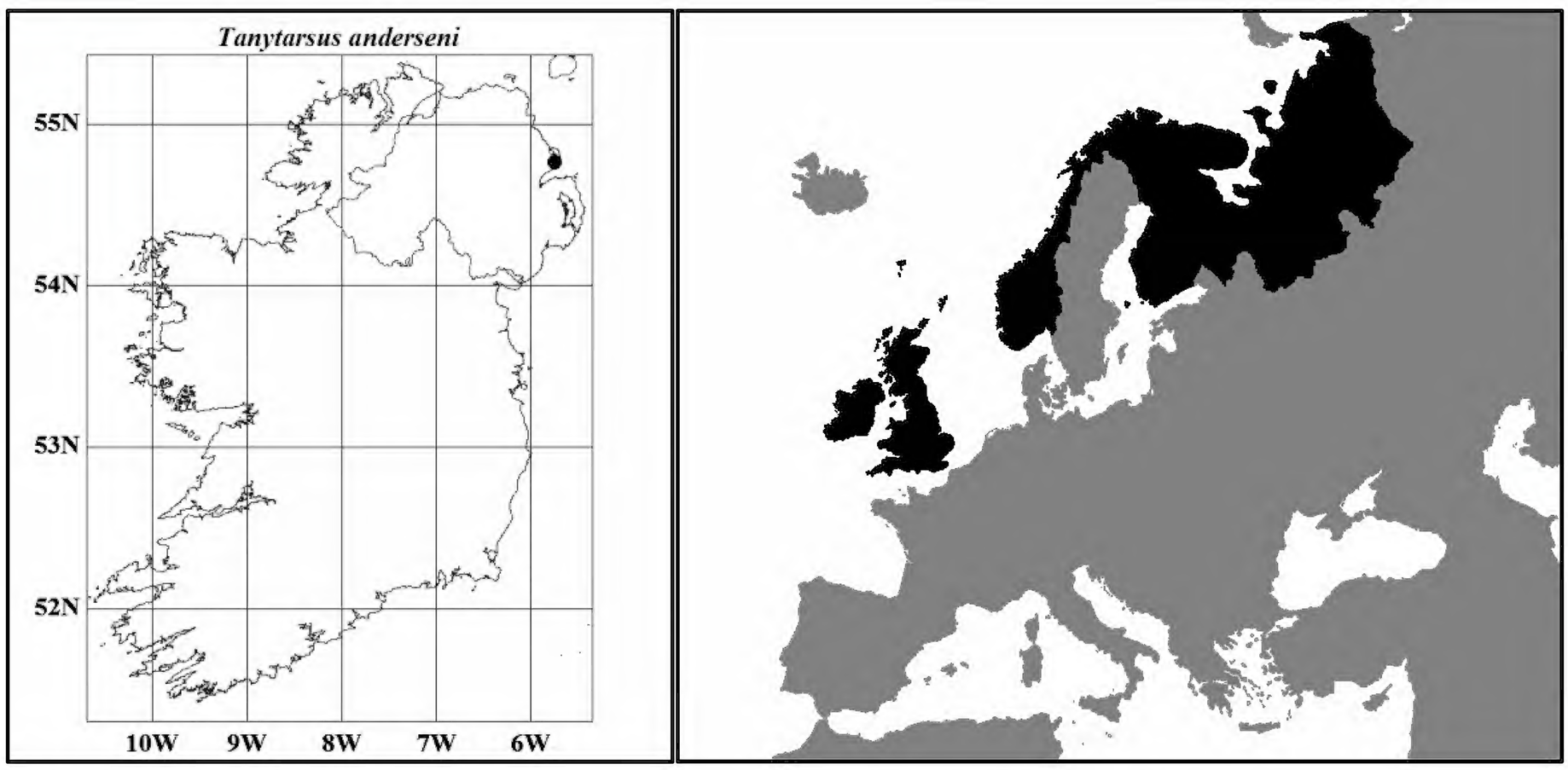
FIGURES 957-958. *Stempellinella edwardsi* Spies & Sæther, 2004.



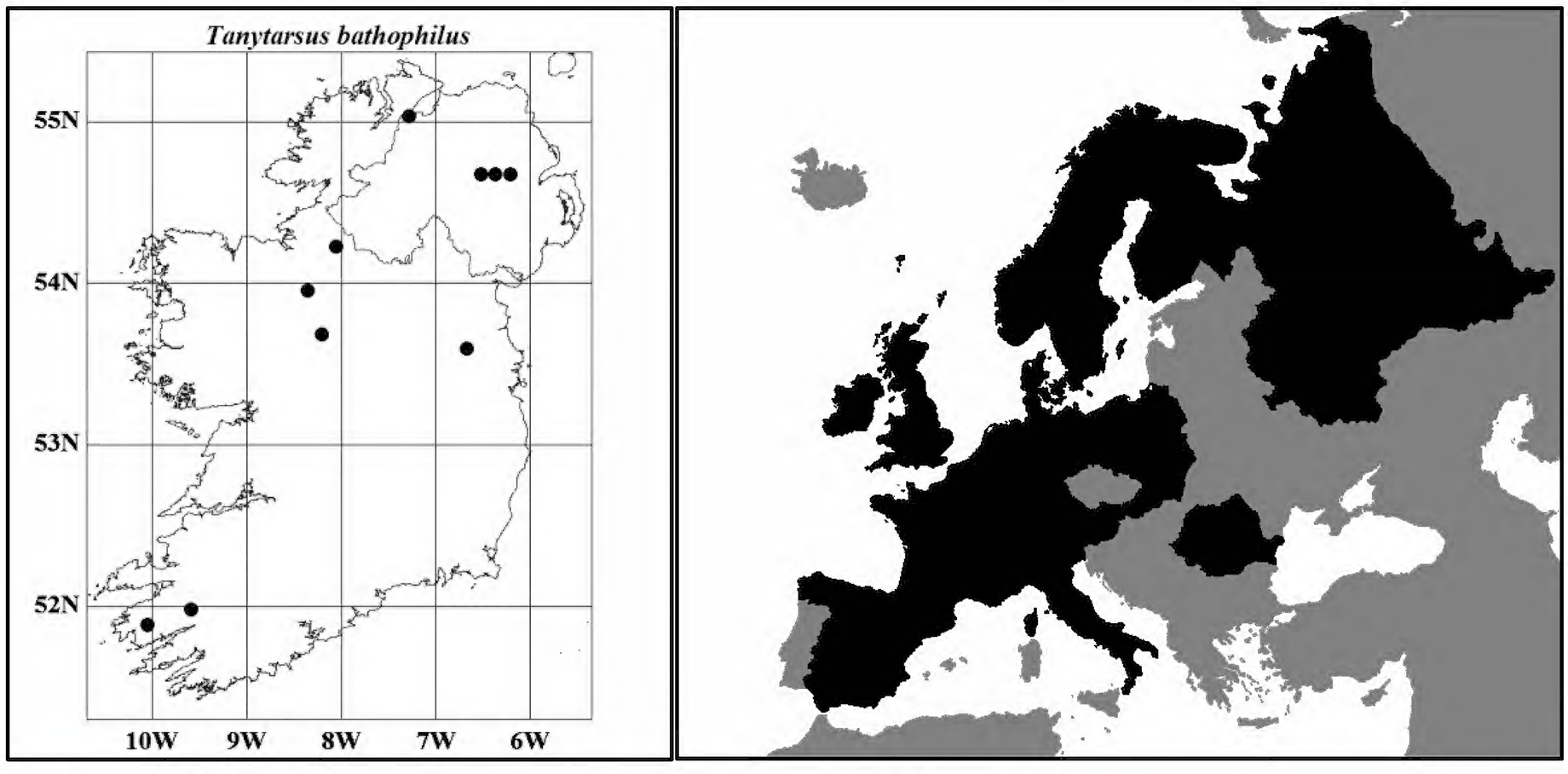
FIGURES 959-960. *Stempellinella reissi* Casas & Vilchez-Quero, 1991.



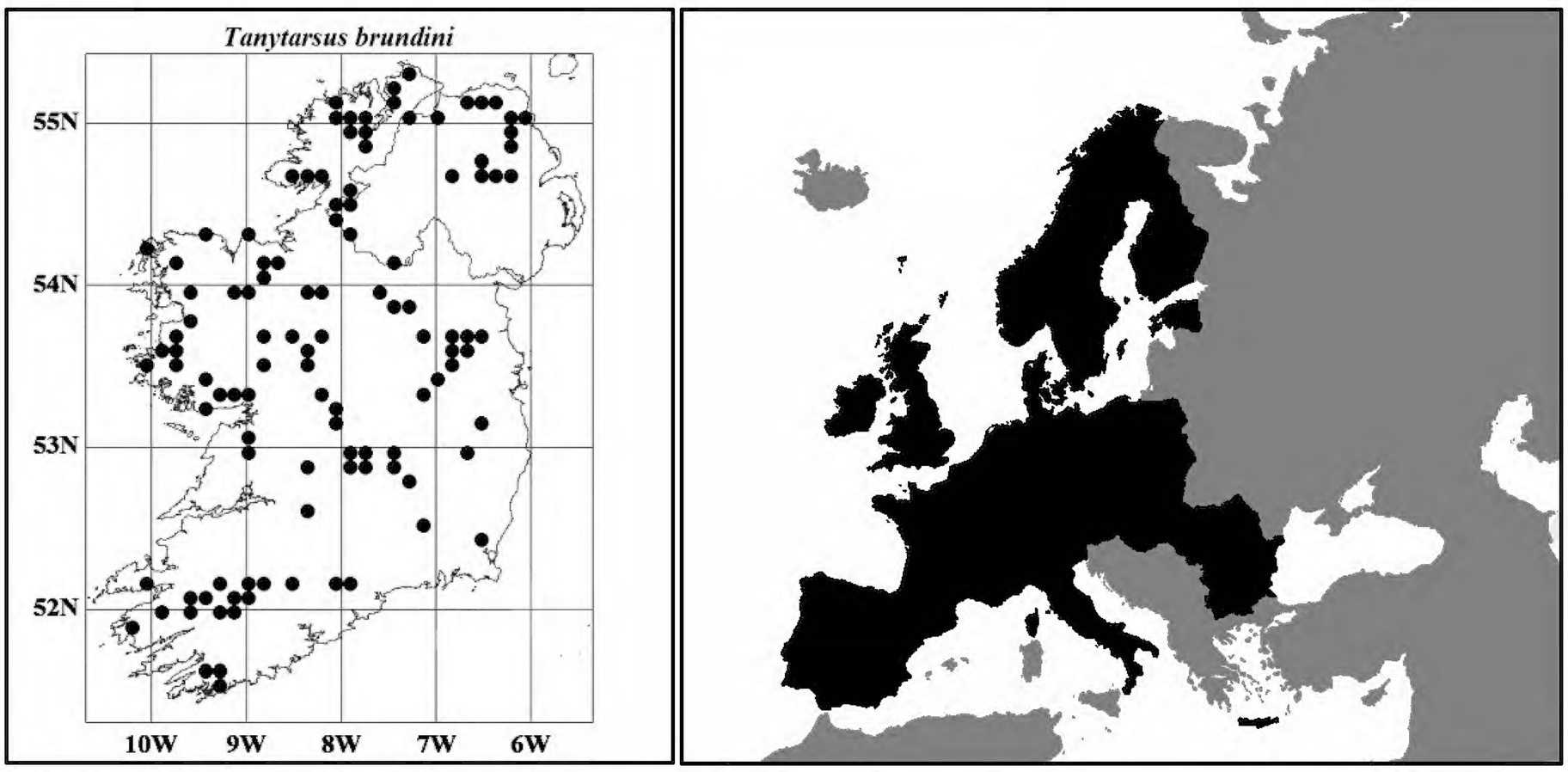
FIGURES 961-962. *Tanytarsus aberrans* Lindeberg, 1970.



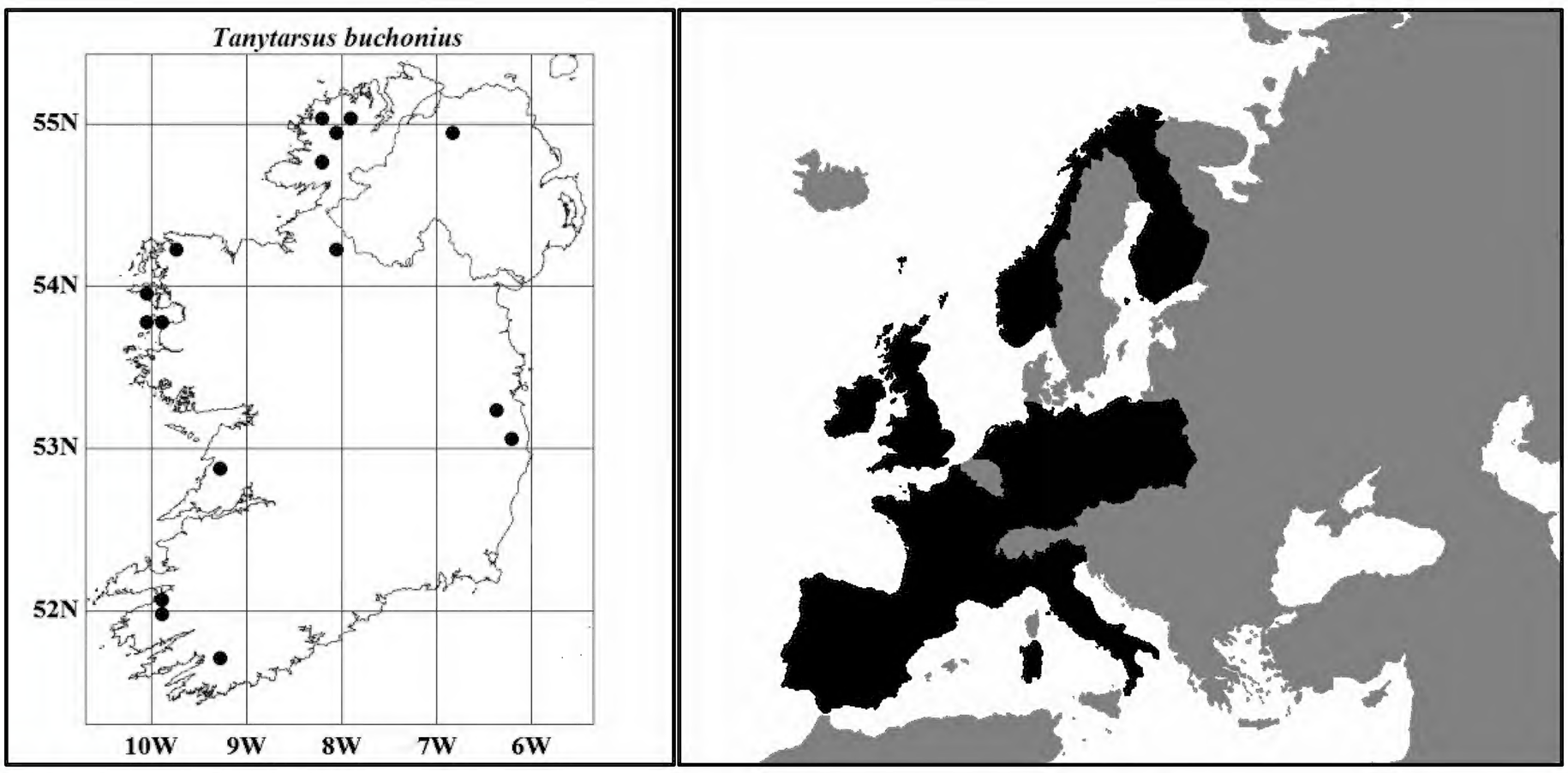
FIGURES 963-964. *Tanytarsus anderseni* Reiss & Fittkau, 1971.



FIGURES 965-966. *Tanytarsus bathophilus* Kieffer, 1911.

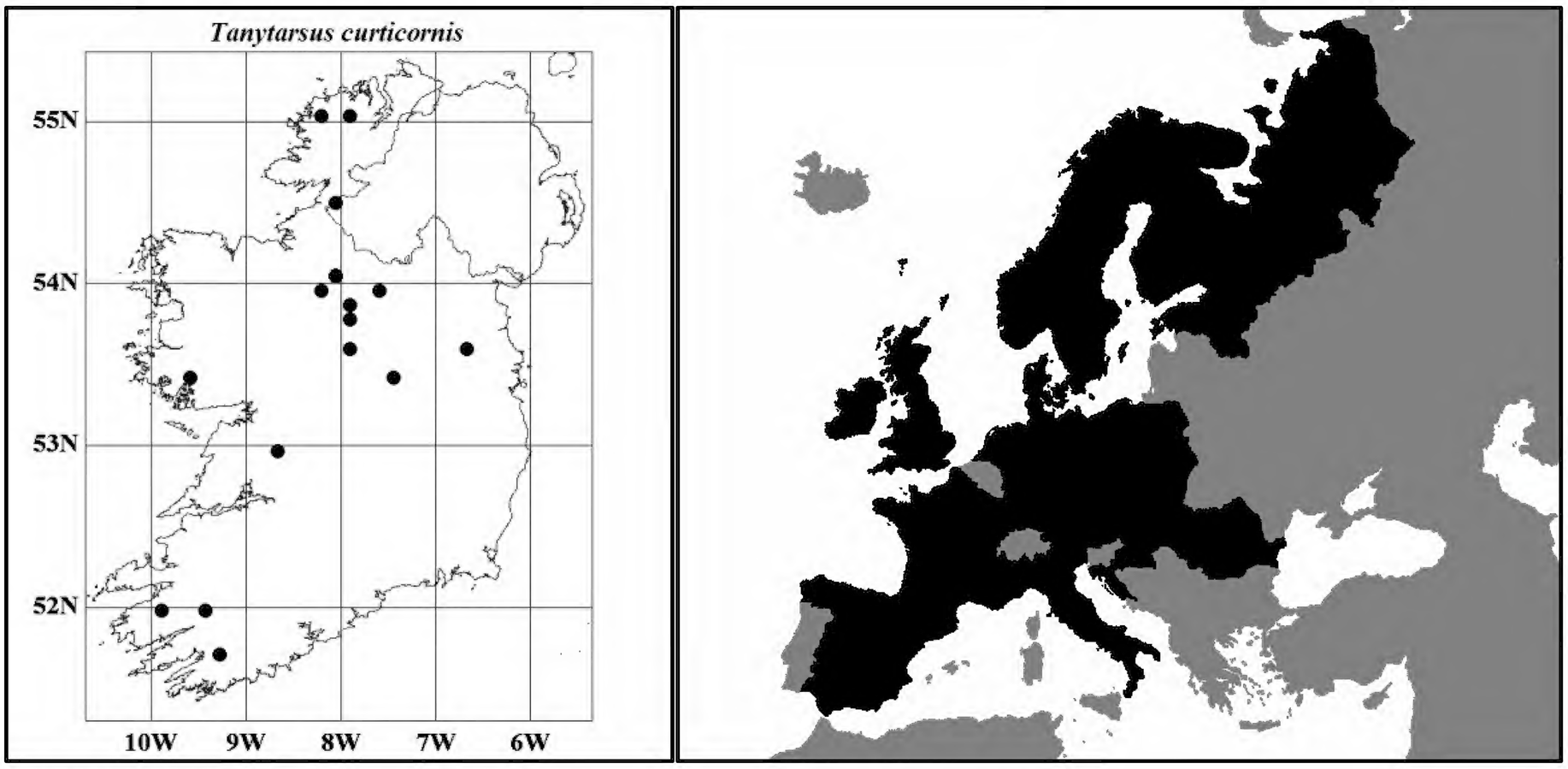


FIGURES 967-968. *Tanytarsus brundini* Lindeberg, 1963.

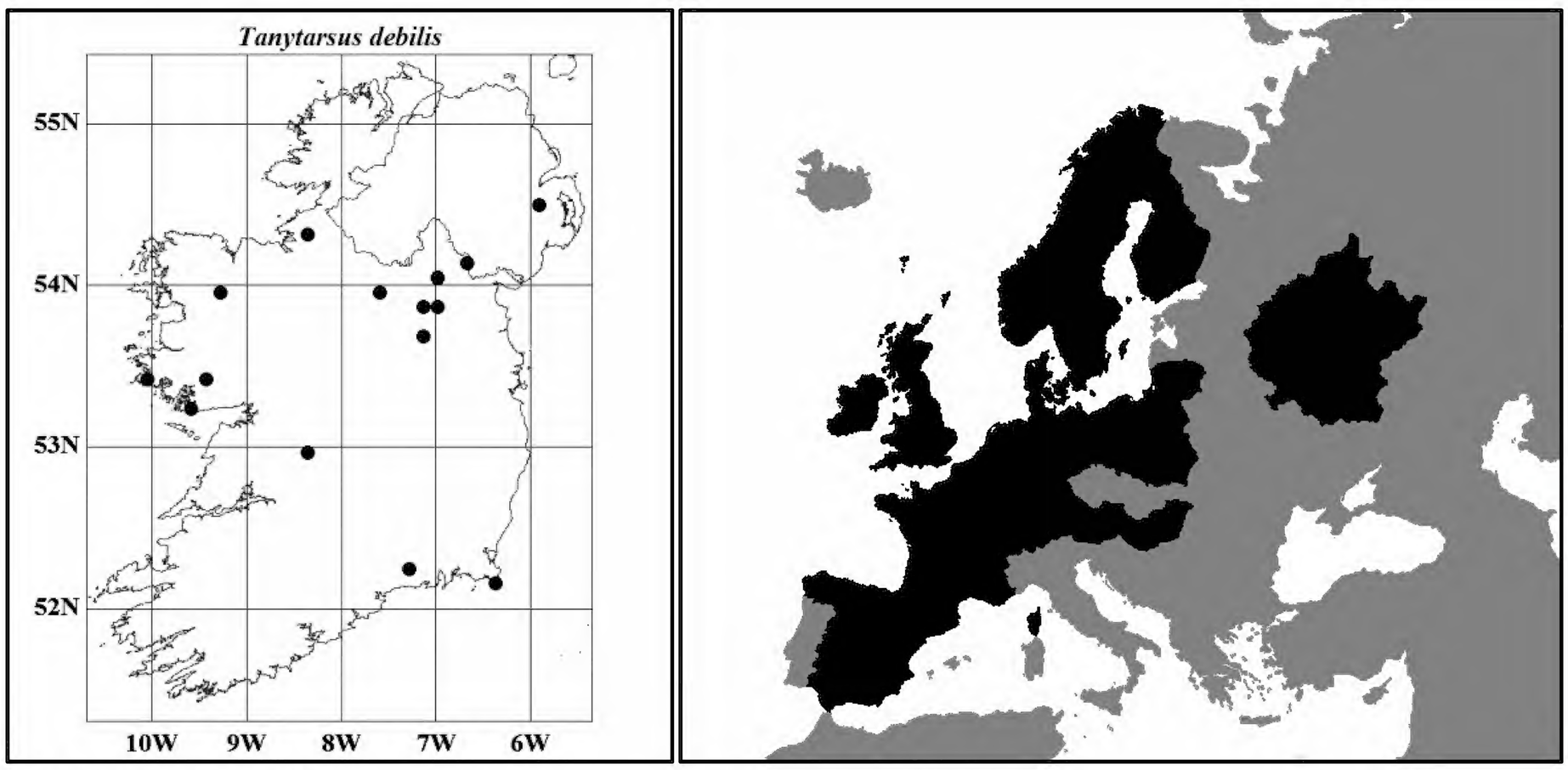


FIGURES 969-970. *Tanytarsus buchonius* Reiss & Fittkau, 1971.

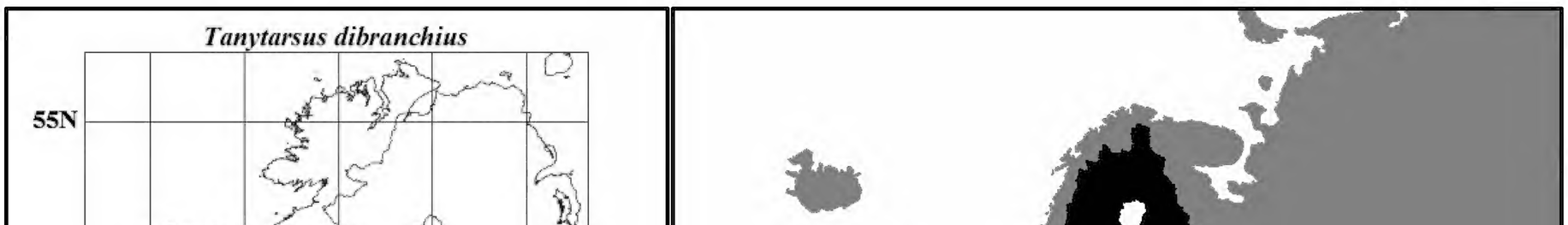
FIGURES 971-972. *Tanytarsus chinyensis* Goetghebuer, 1934.



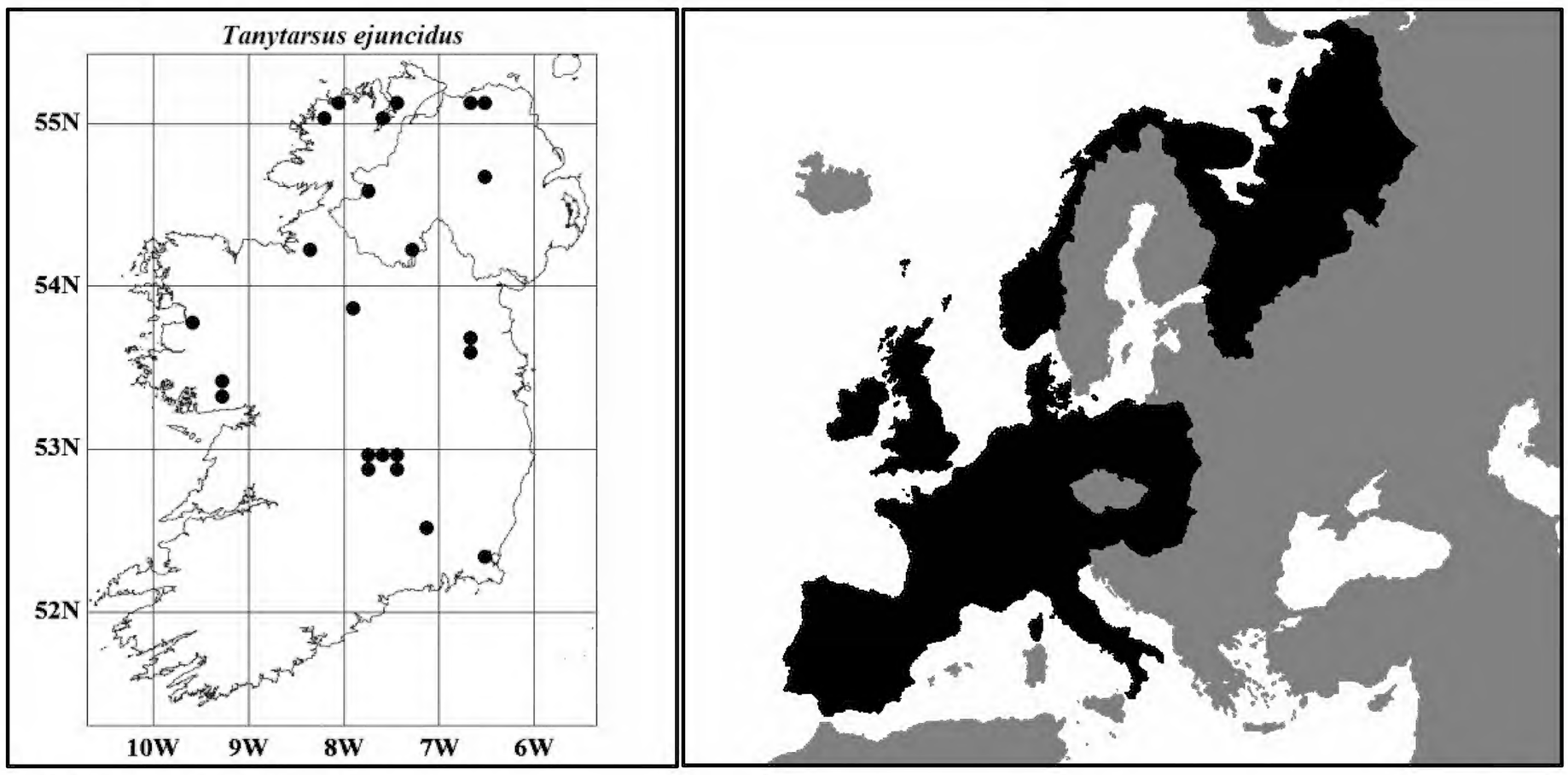
FIGURES 973-974. *Tanytarsus curticornis* Kieffer, 1911.



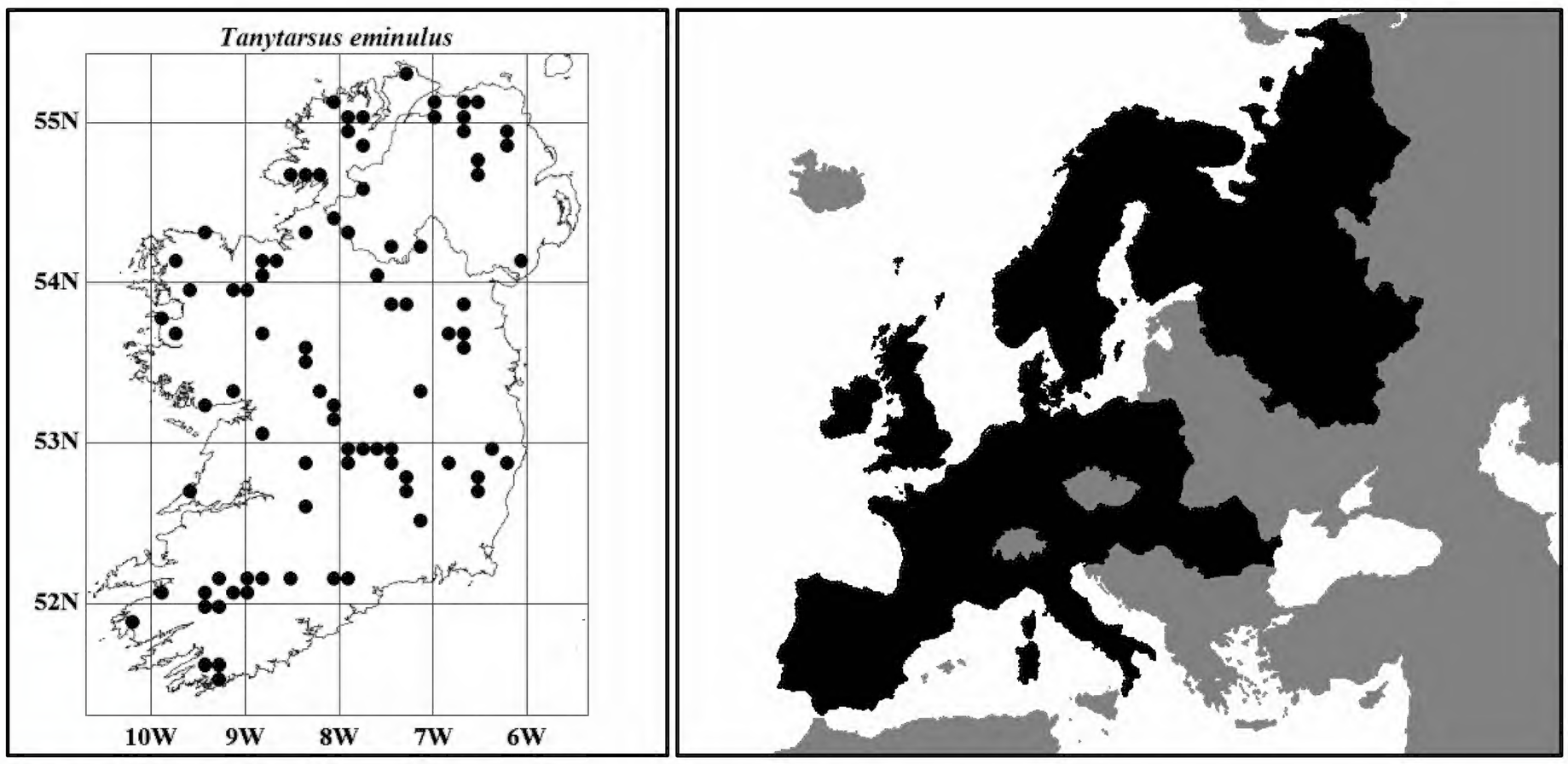
FIGURES 975-976. *Tanytarsus debilis* (Meigen, 1830).



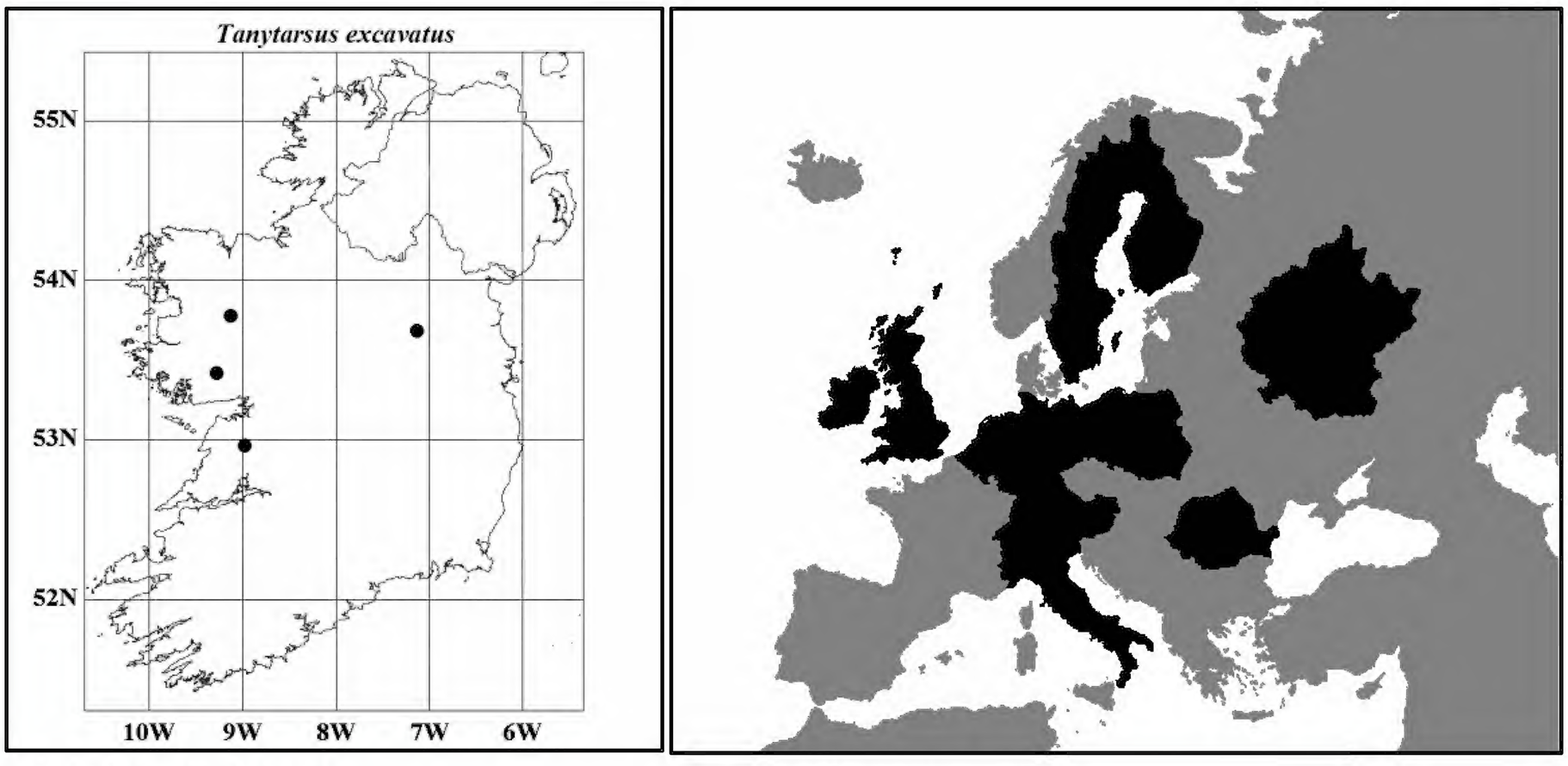
FIGURES 977-978. *Tanytarsus dibranchius* Kieffer, 1926.



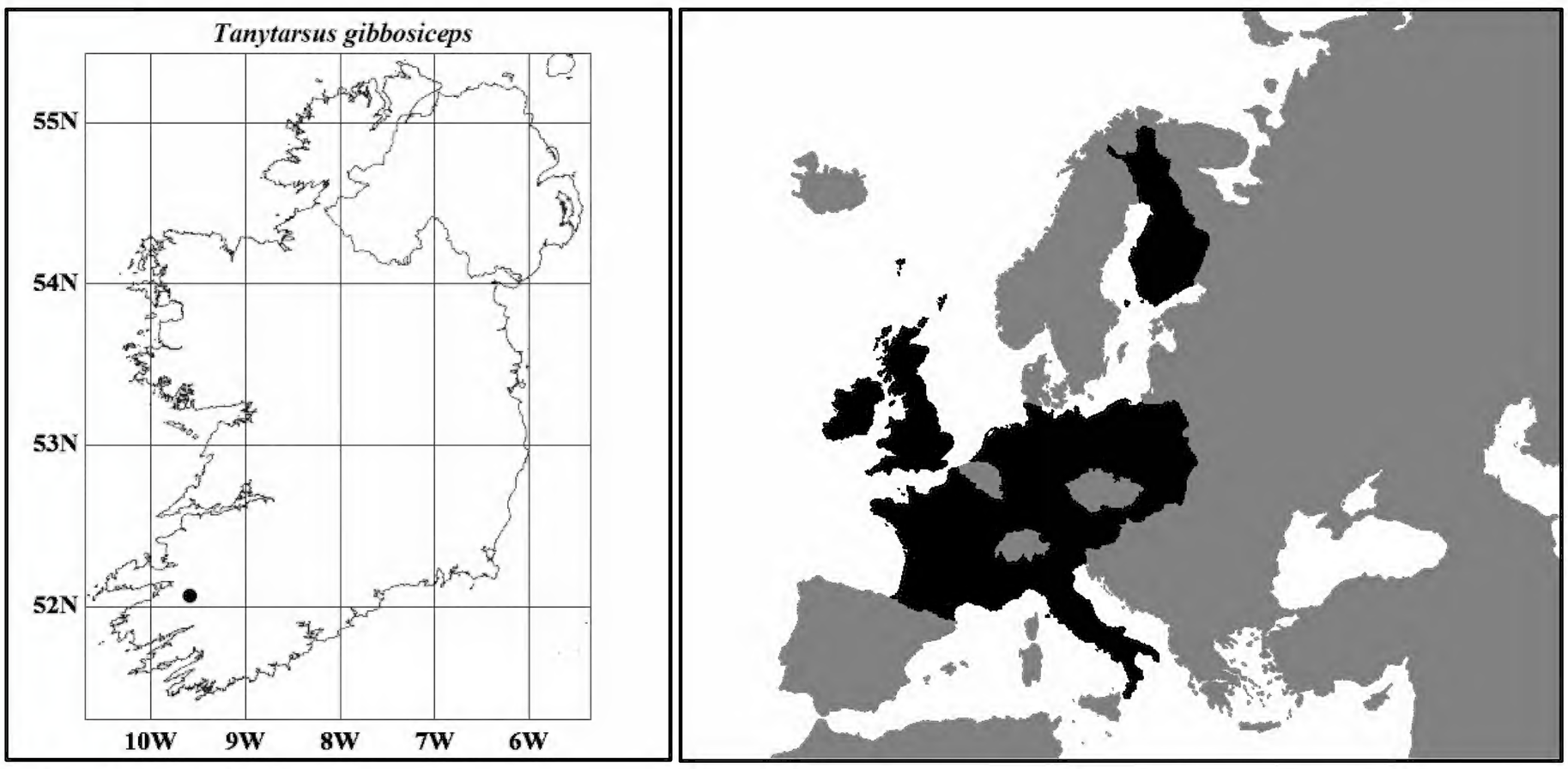
FIGURES 979-980. *Tanytarsus ejuncidus* (Walker, 1856).



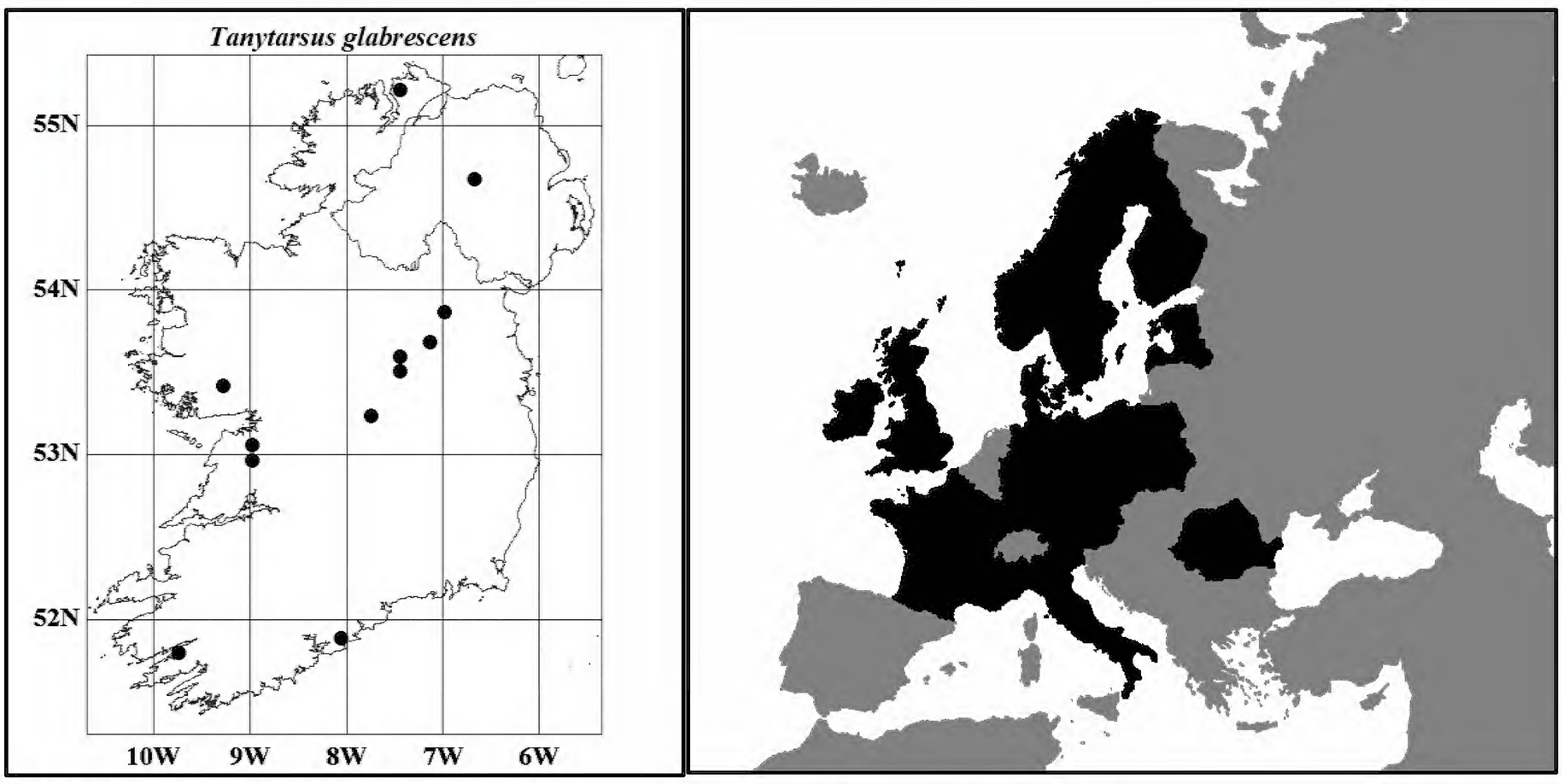
FIGURES 981-982. *Tanytarsus eminulus* (Walker, 1856).



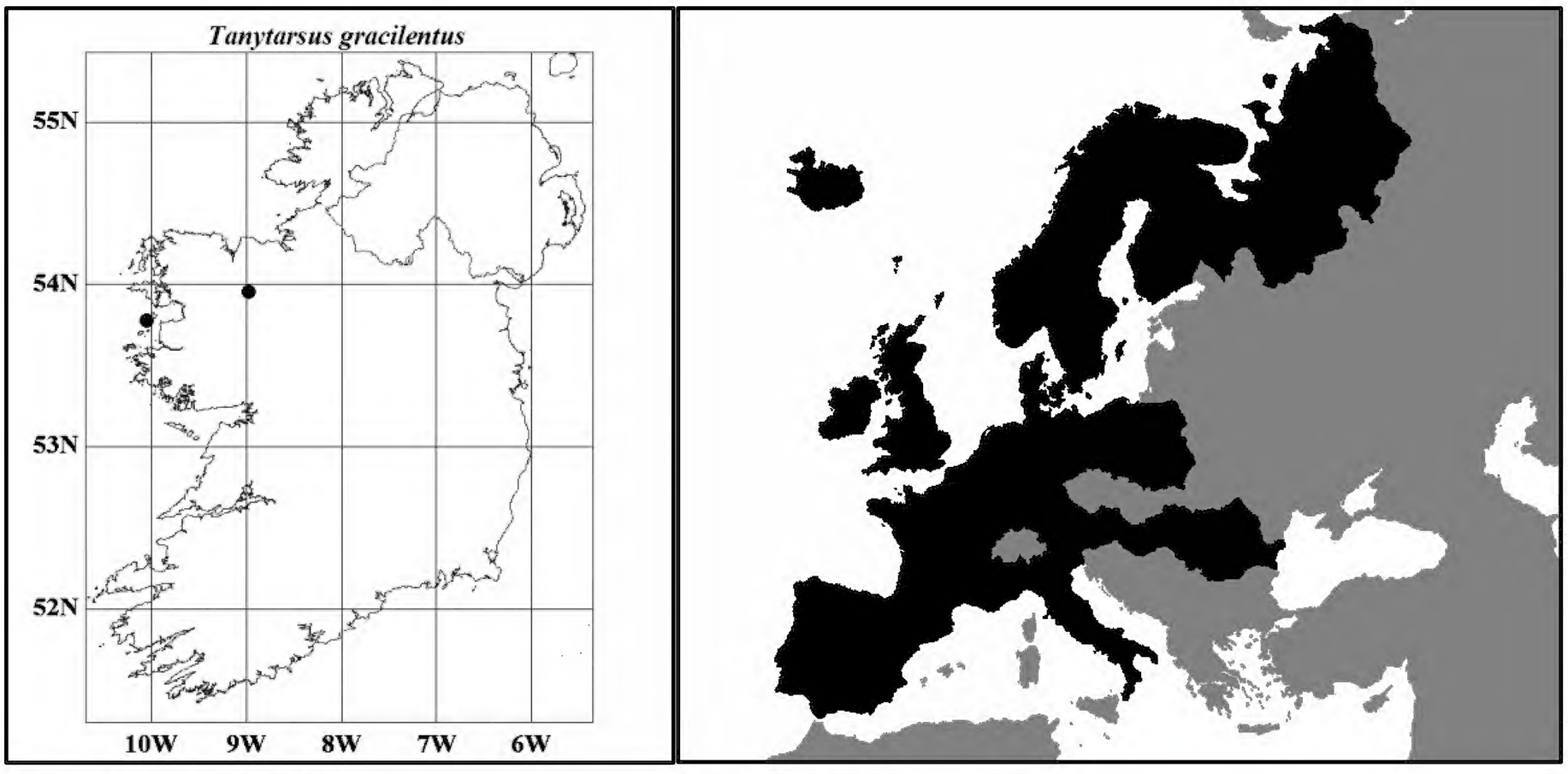
FIGURES 983-984. *Tanytarsus excavatus* Edwards, 1929.



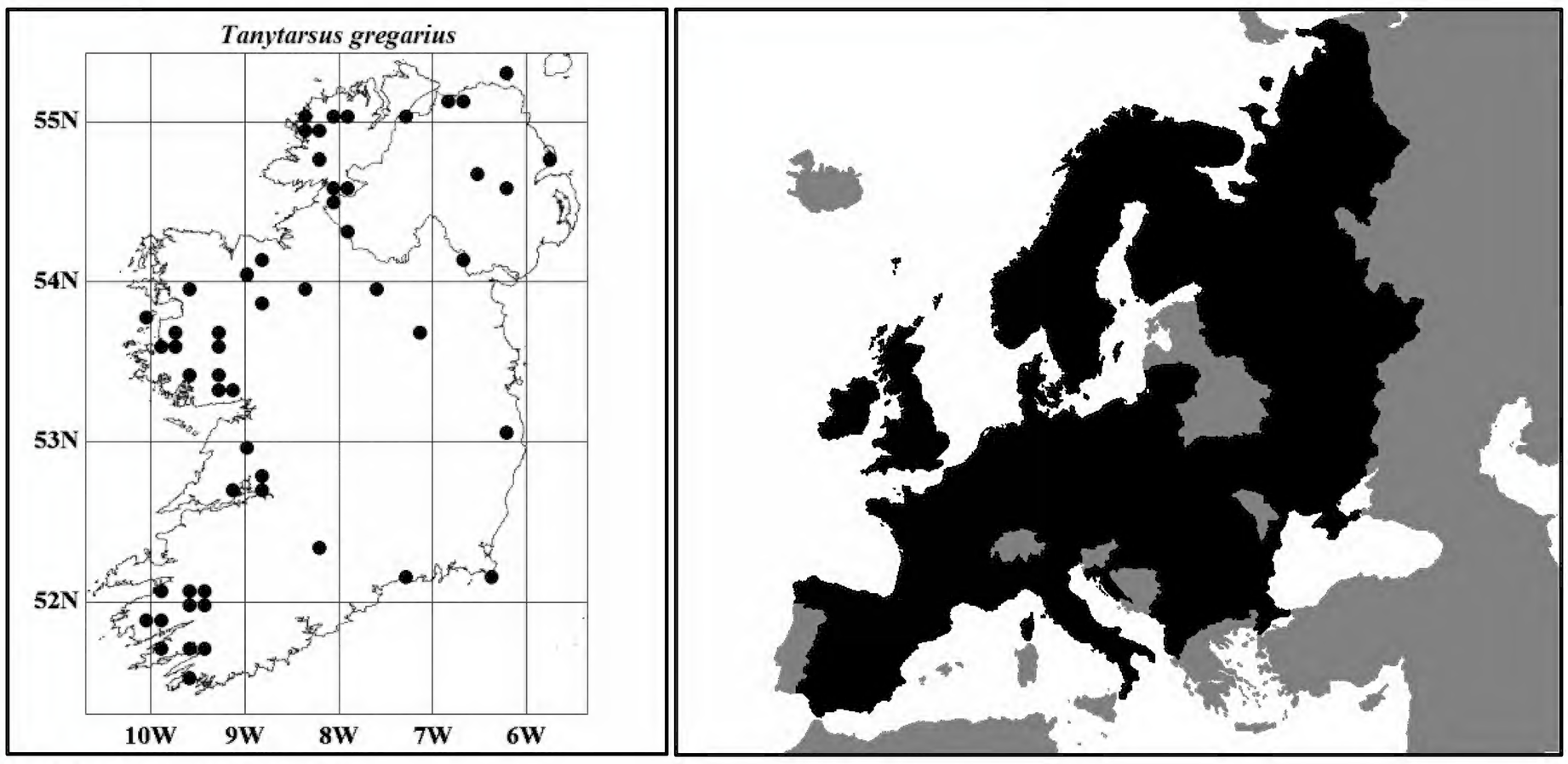
FIGURES 985-986. *Tanytarsus gibbosiceps* Kieffer, 1922.



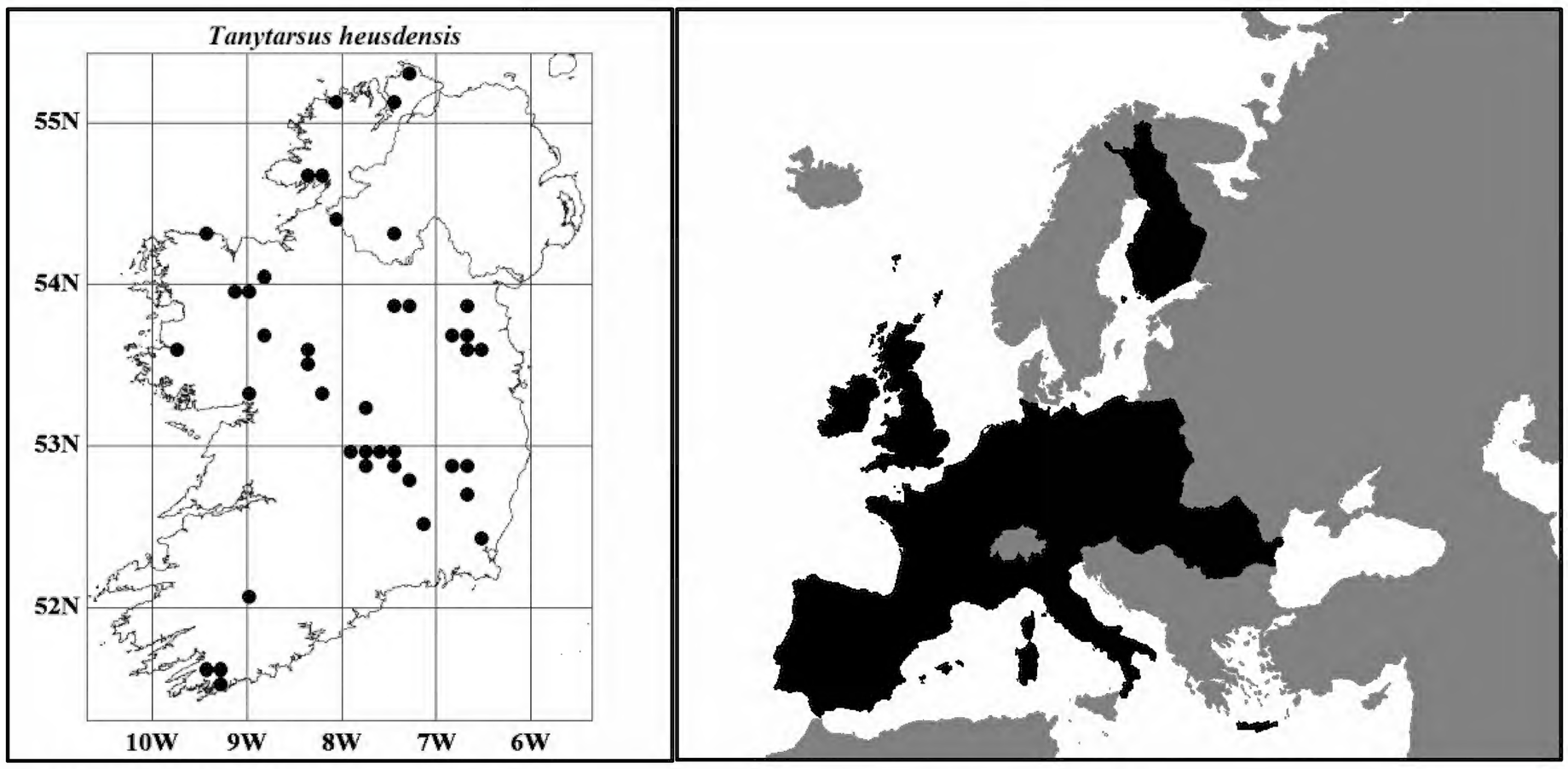
FIGURES 987-988. *Tanytarsus glabrescens* Edwards, 1929.



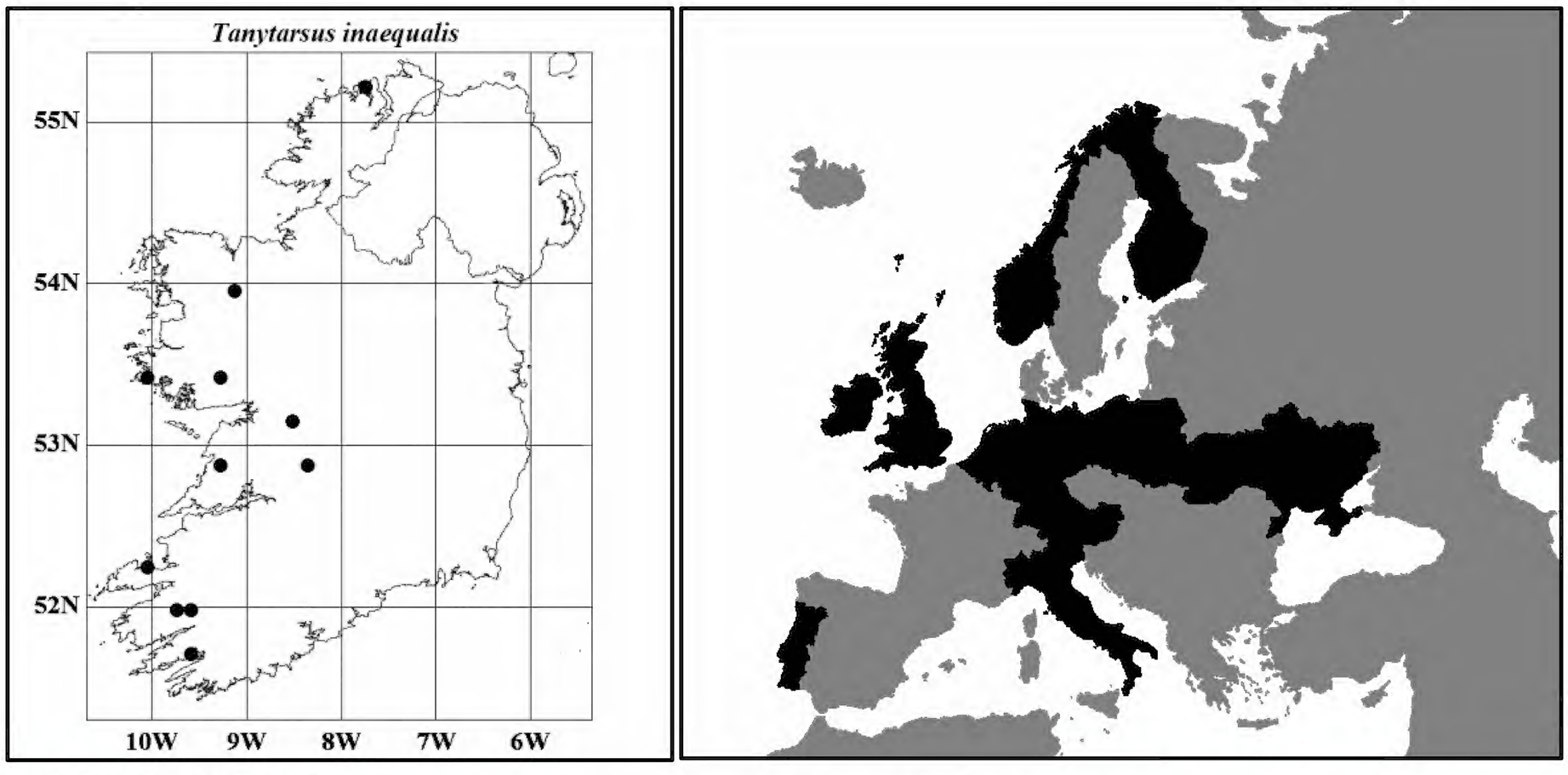
FIGURES 989-990. *Tanytarsus gracilentus* (Holmgren, 1883).



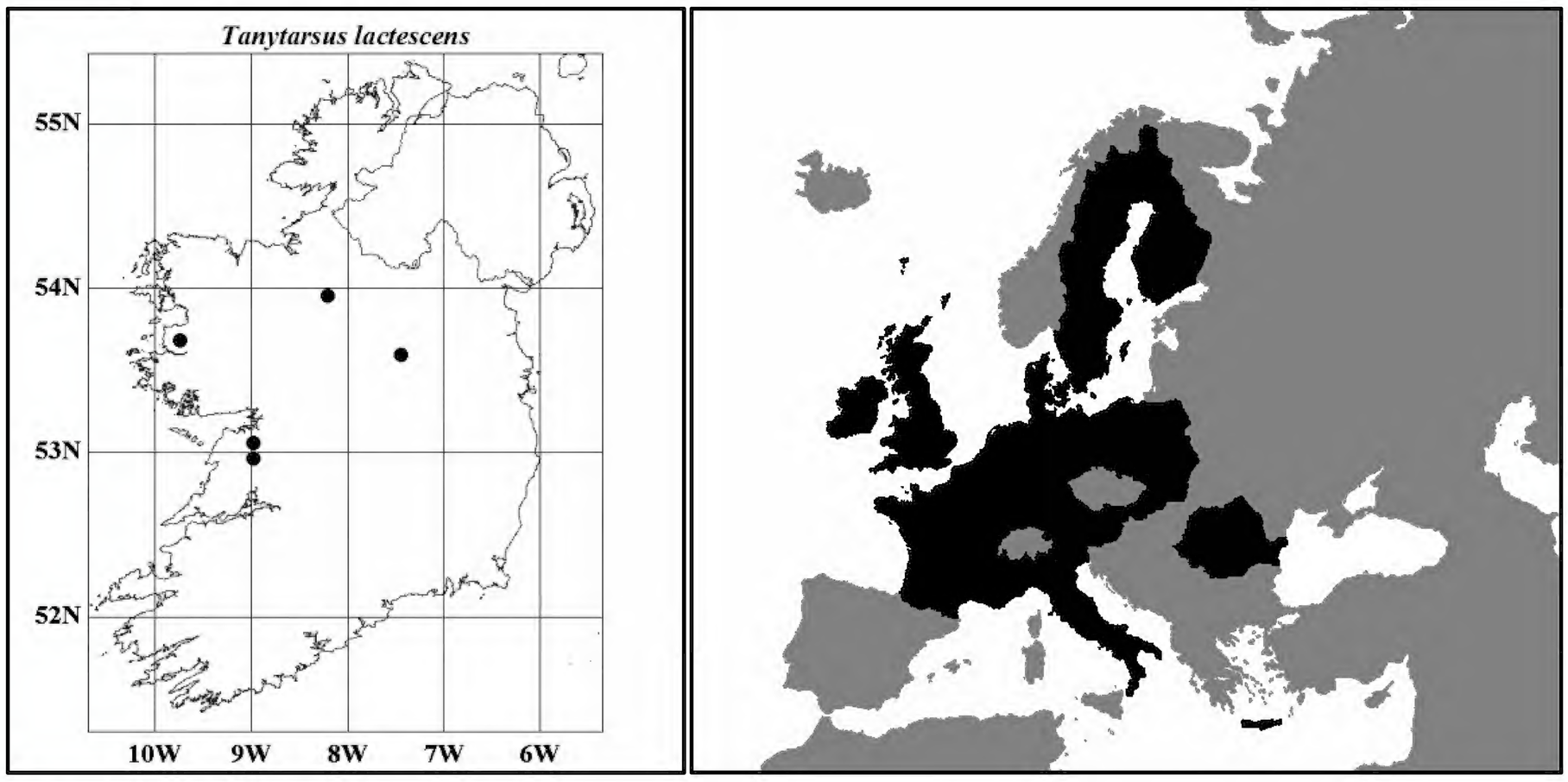
FIGURES 991-992. *Tanytarsus gregarius* Kieffer, 1909.



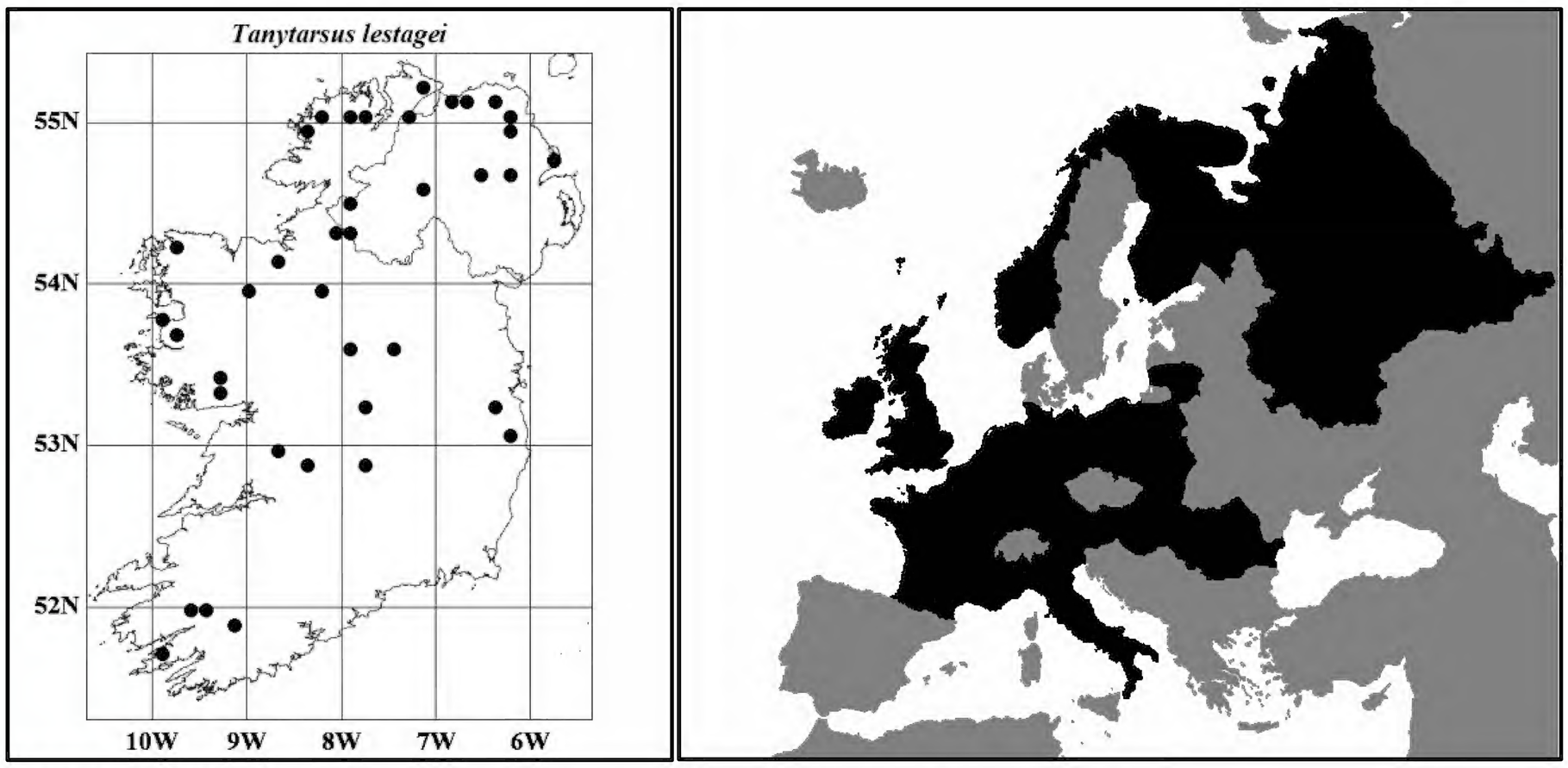
FIGURES 993-994. *Tanytarsus heusdensis* Goetghebuer, 1923.



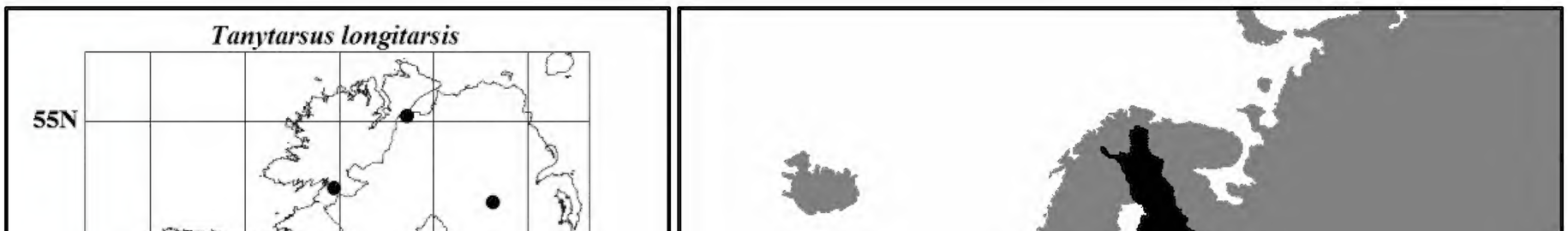
FIGURES 995-996. *Tanytarsus inaequalis* Goetghebuer, 1921.



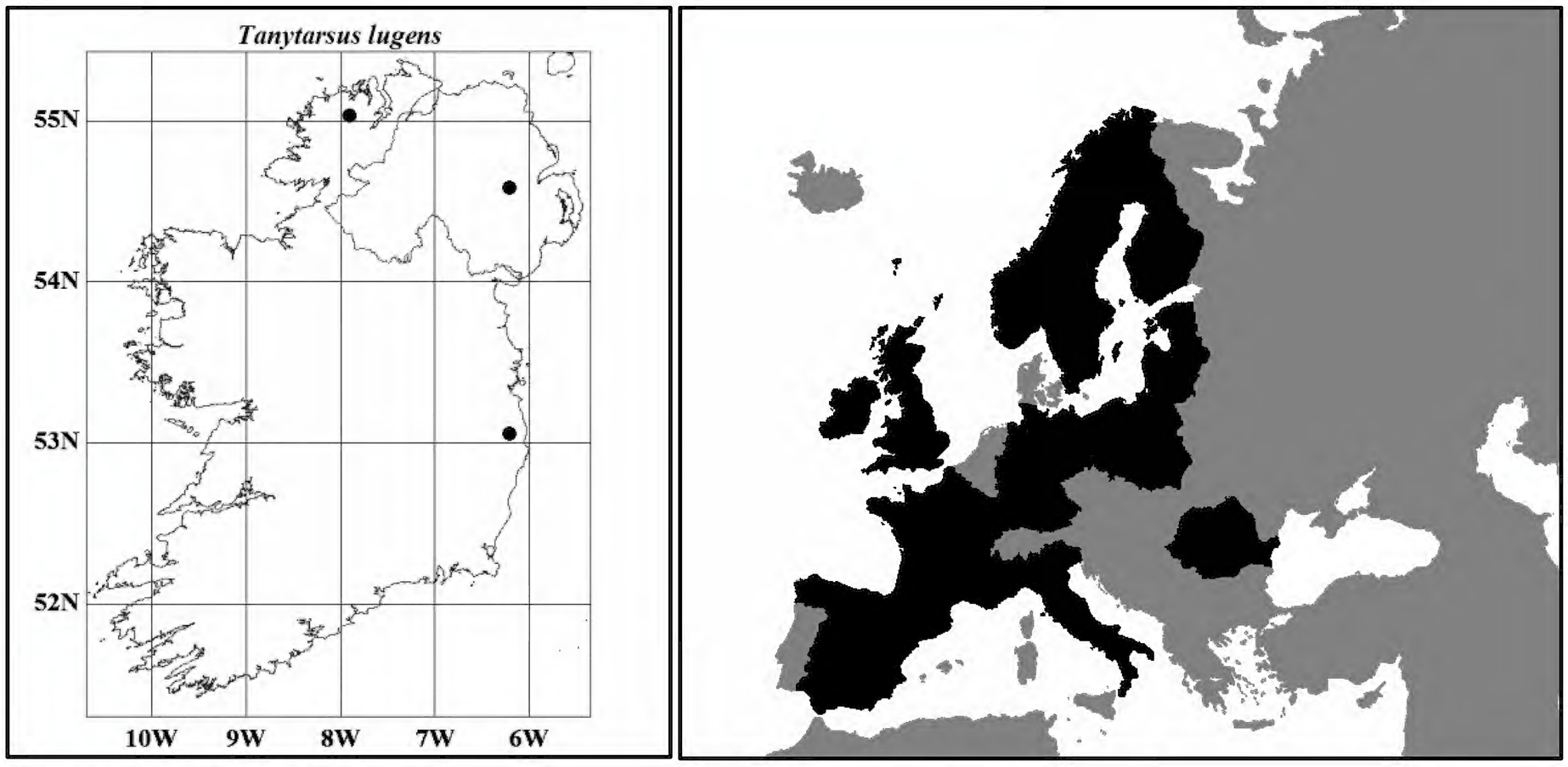
FIGURES 997-998. *Tanytarsus lactescens* Edwards, 1929.



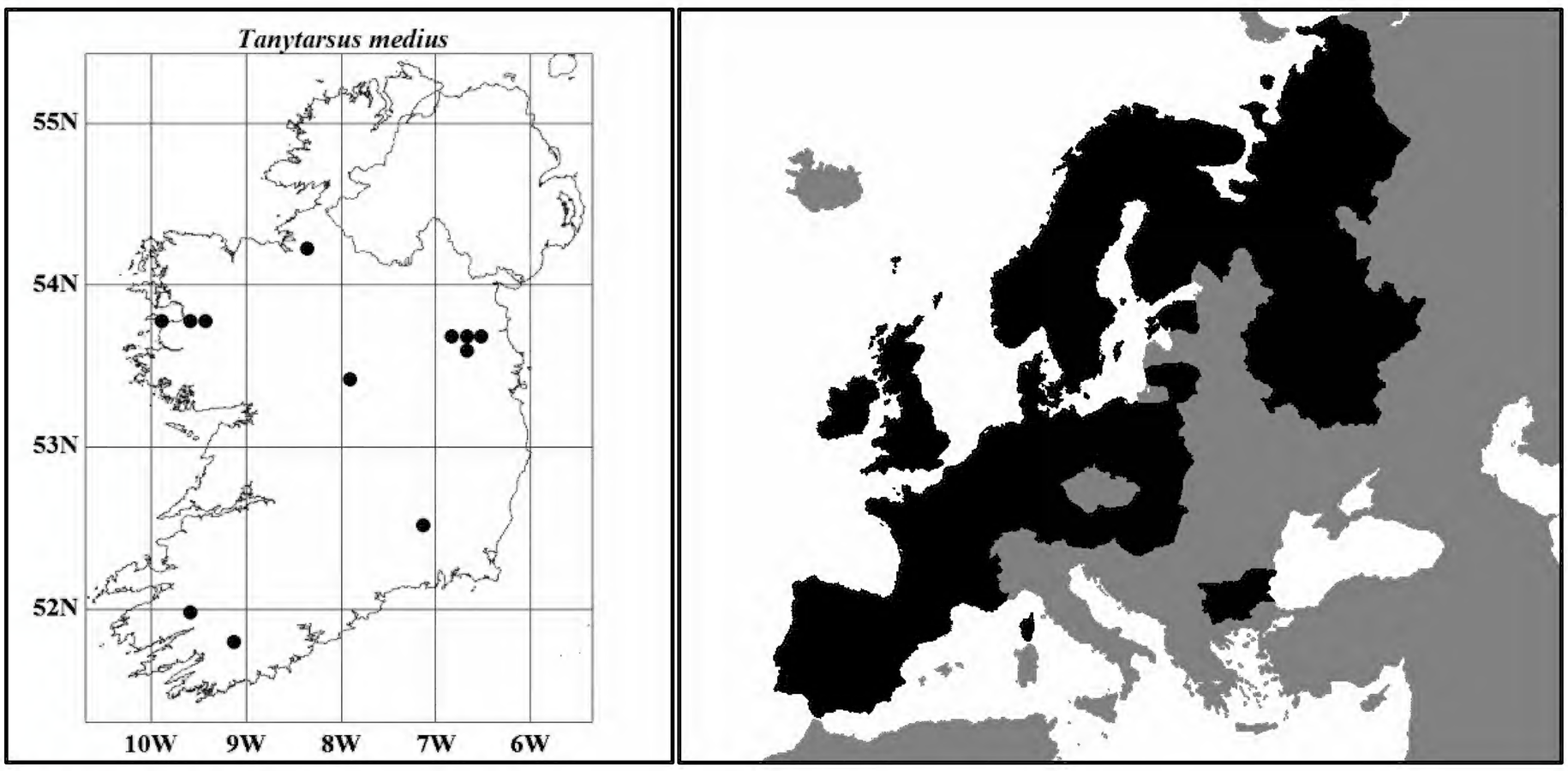
FIGURES 999-1000. *Tanytarsus lestagei* Goetghebuer, 1922.



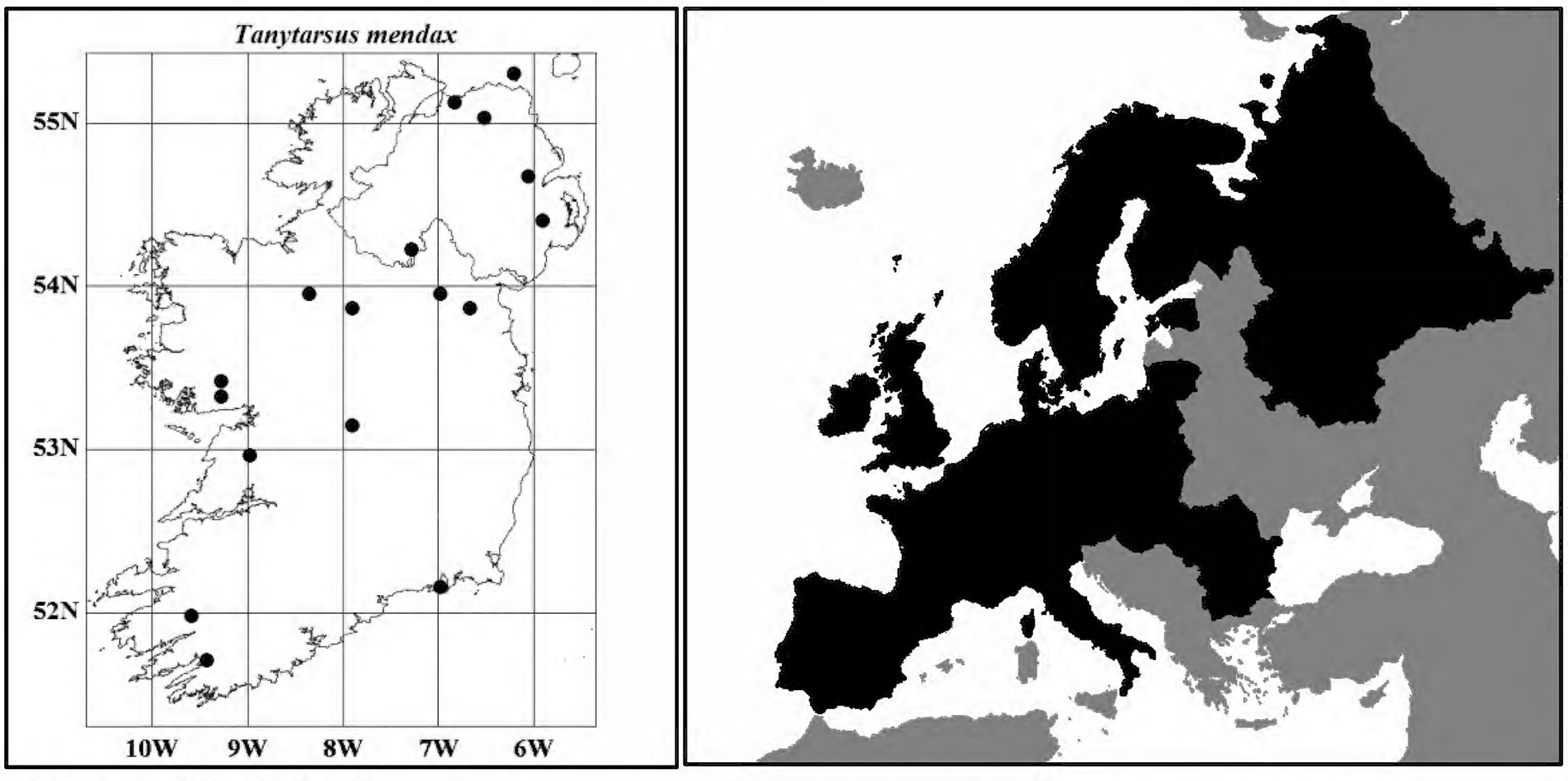
FIGURES 1001-1002. *Tanytarsus longitarsis* Kieffer, 1911.



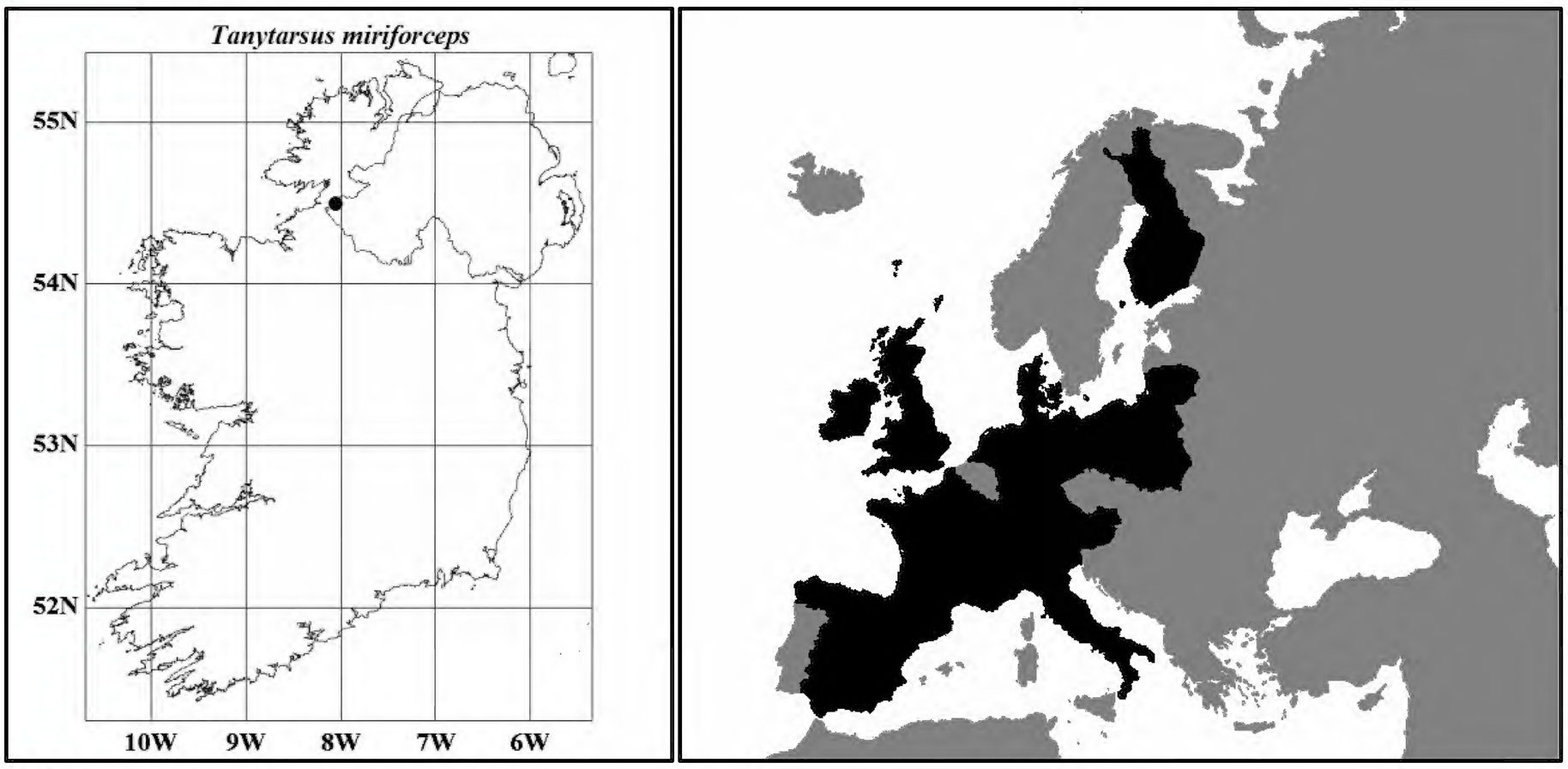
FIGURES 1003-1004. *Tanytarsus lugens* (Kieffer, 1916).



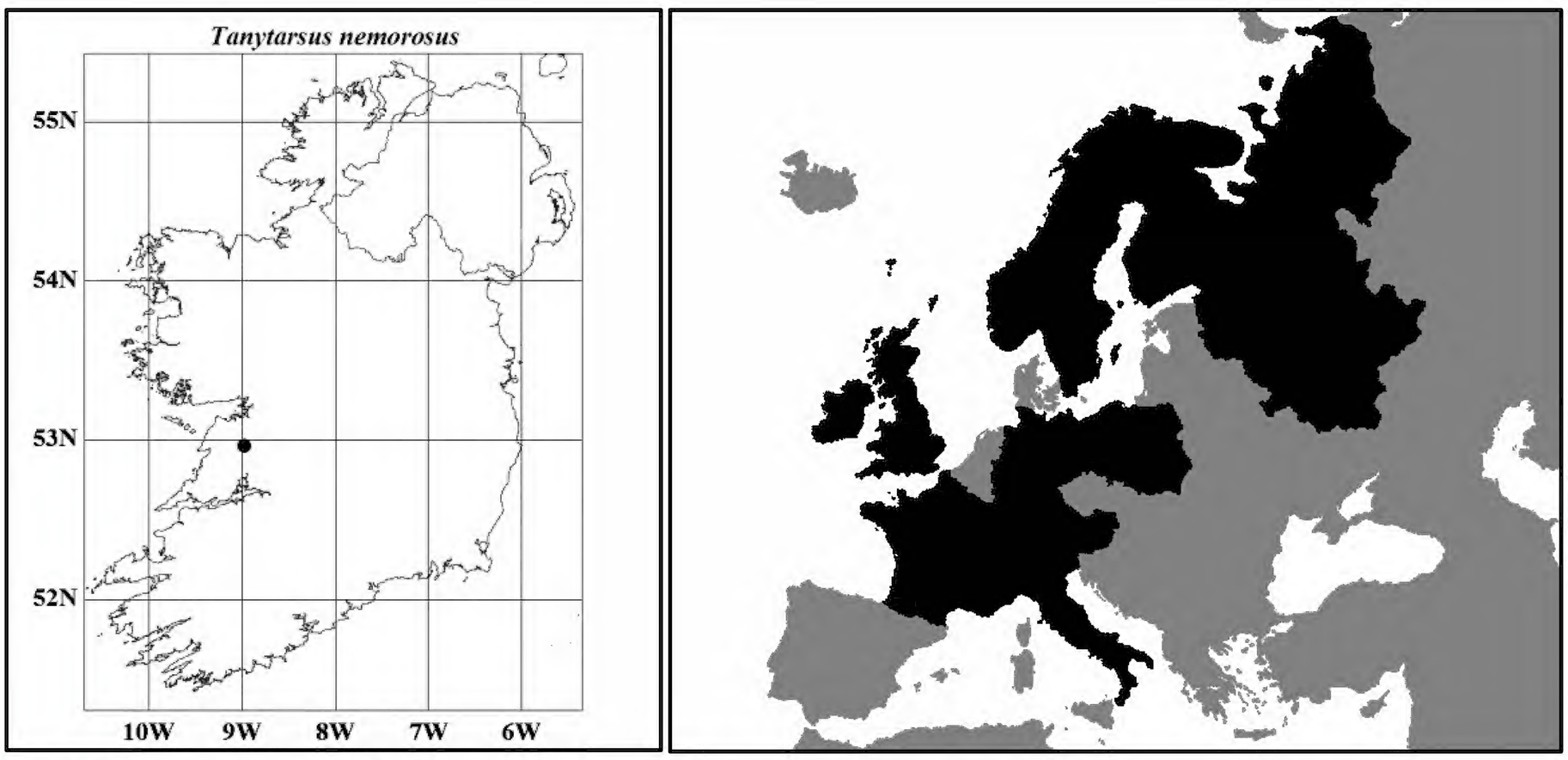
FIGURES 1005-1006. *Tanytarsus medius* Reiss & Fittkau, 1971.



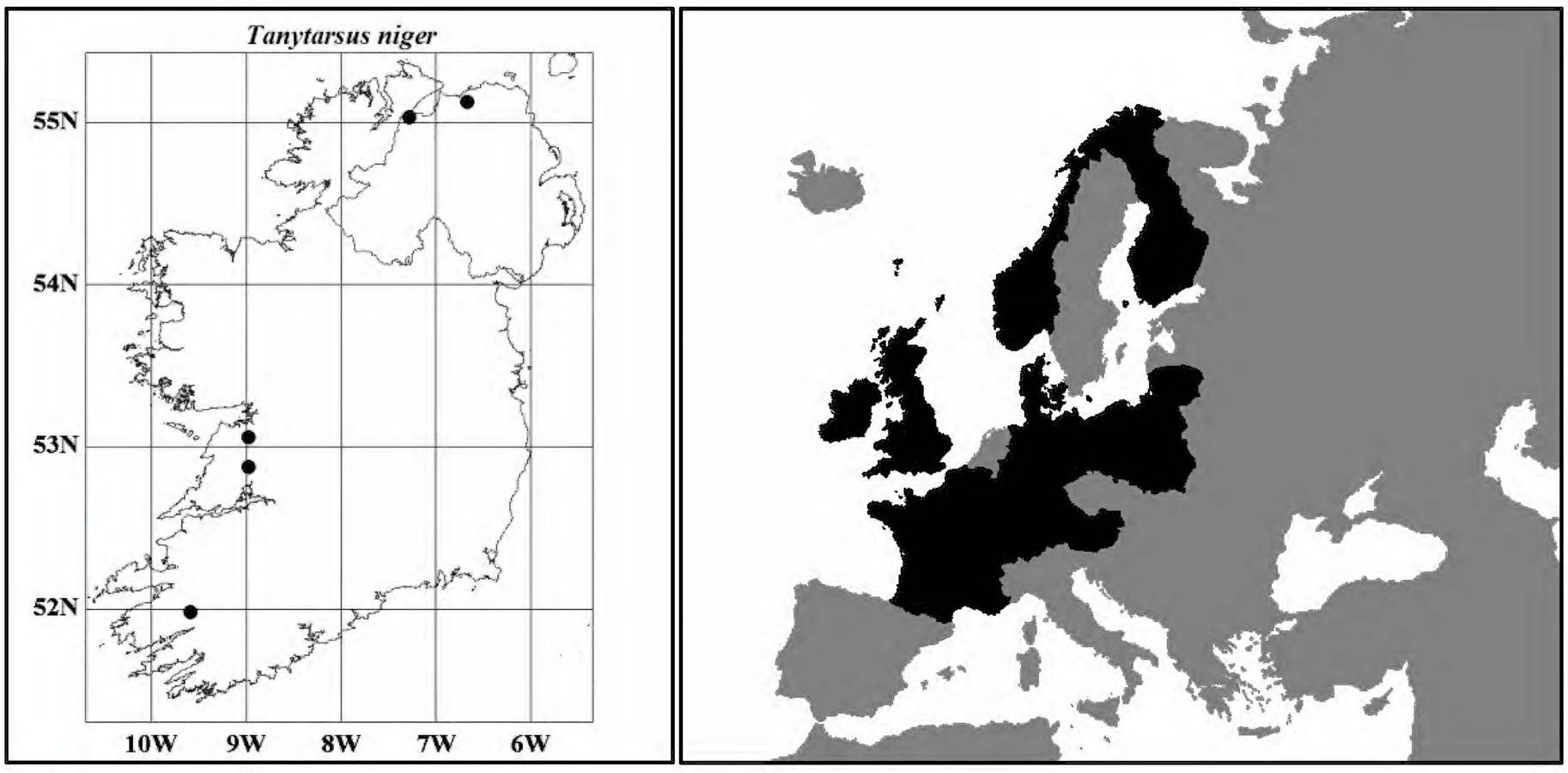
FIGURES 1007-1008. *Tanytarsus mendax* Kieffer, 1925.



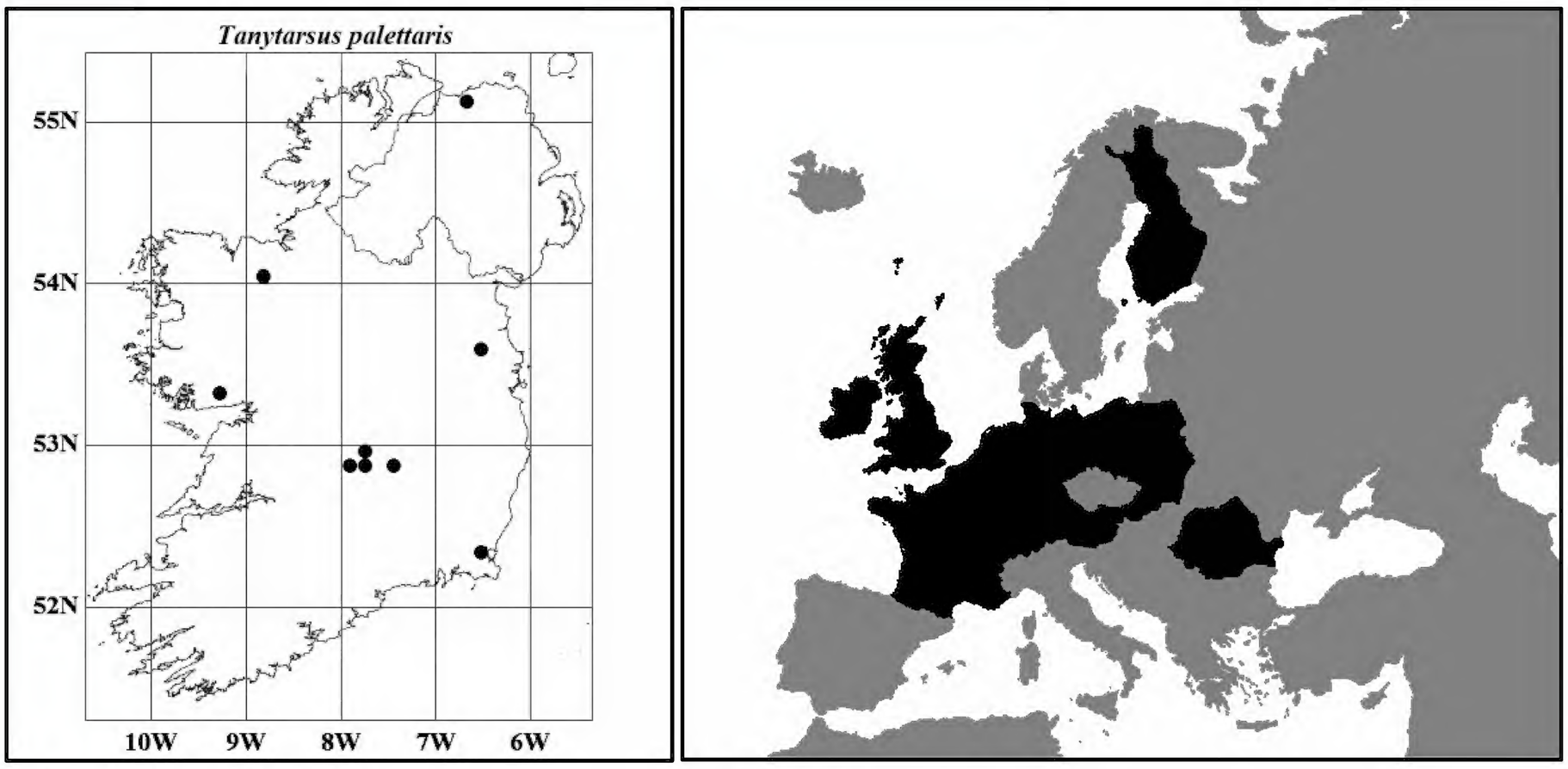
FIGURES 1009-1010. *Tanytarsus miriforceps* (Kieffer, 1921).



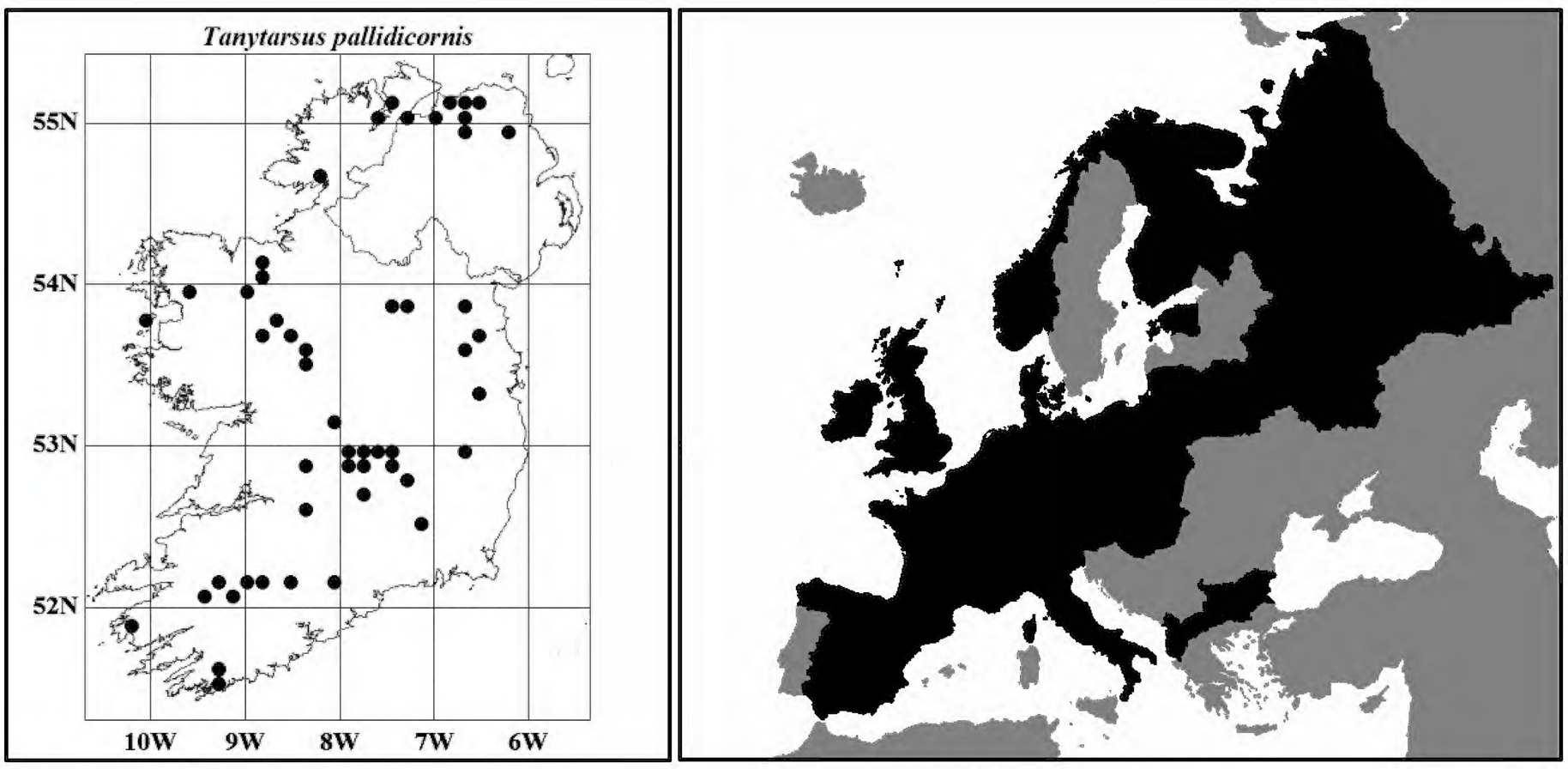
FIGURES 1011-1012. *Tanytarsus nemorosus* Edwards, 1929.



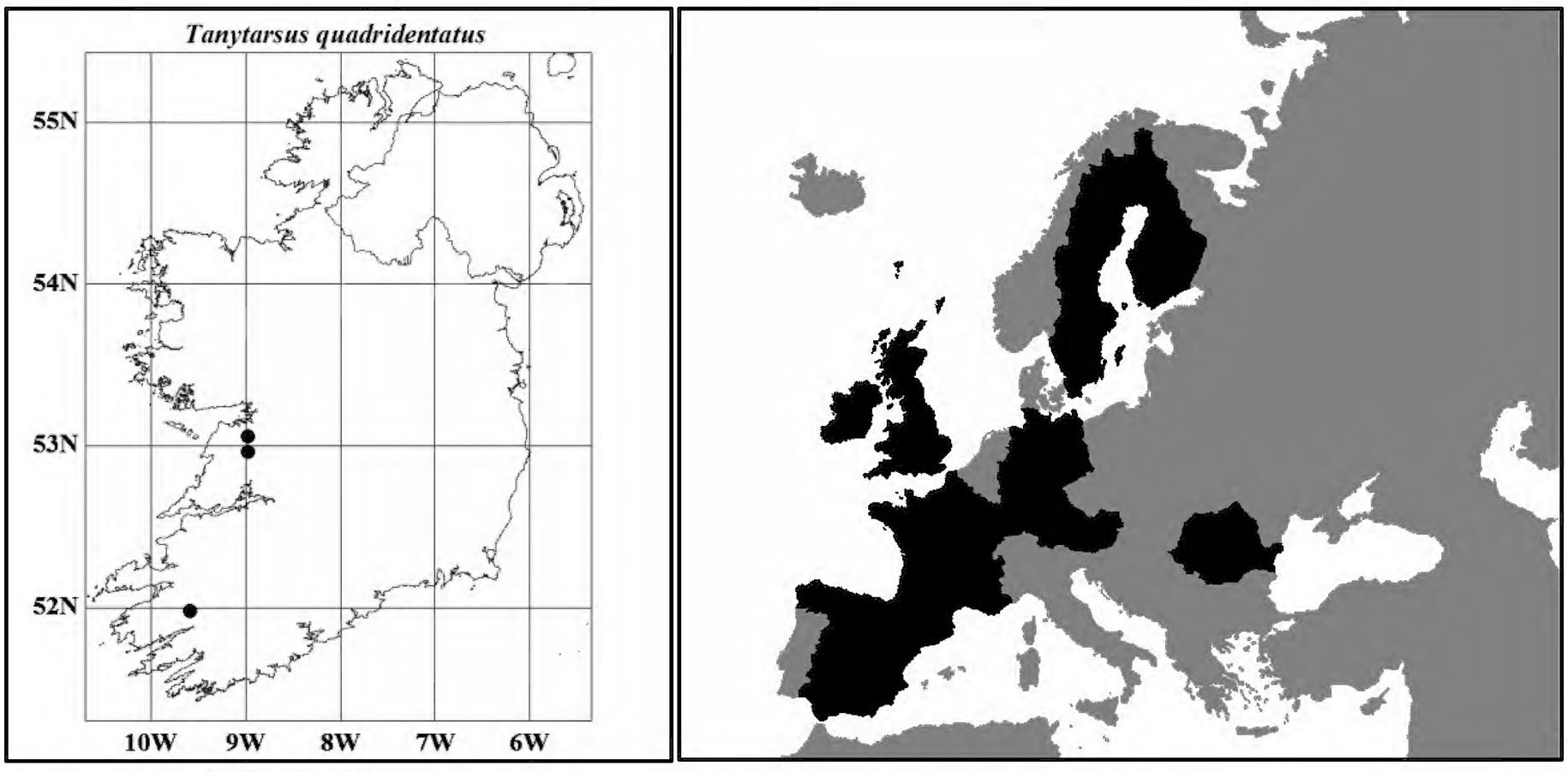
FIGURES 1013-1014. *Tanytarsus niger* Andersen, 1937.



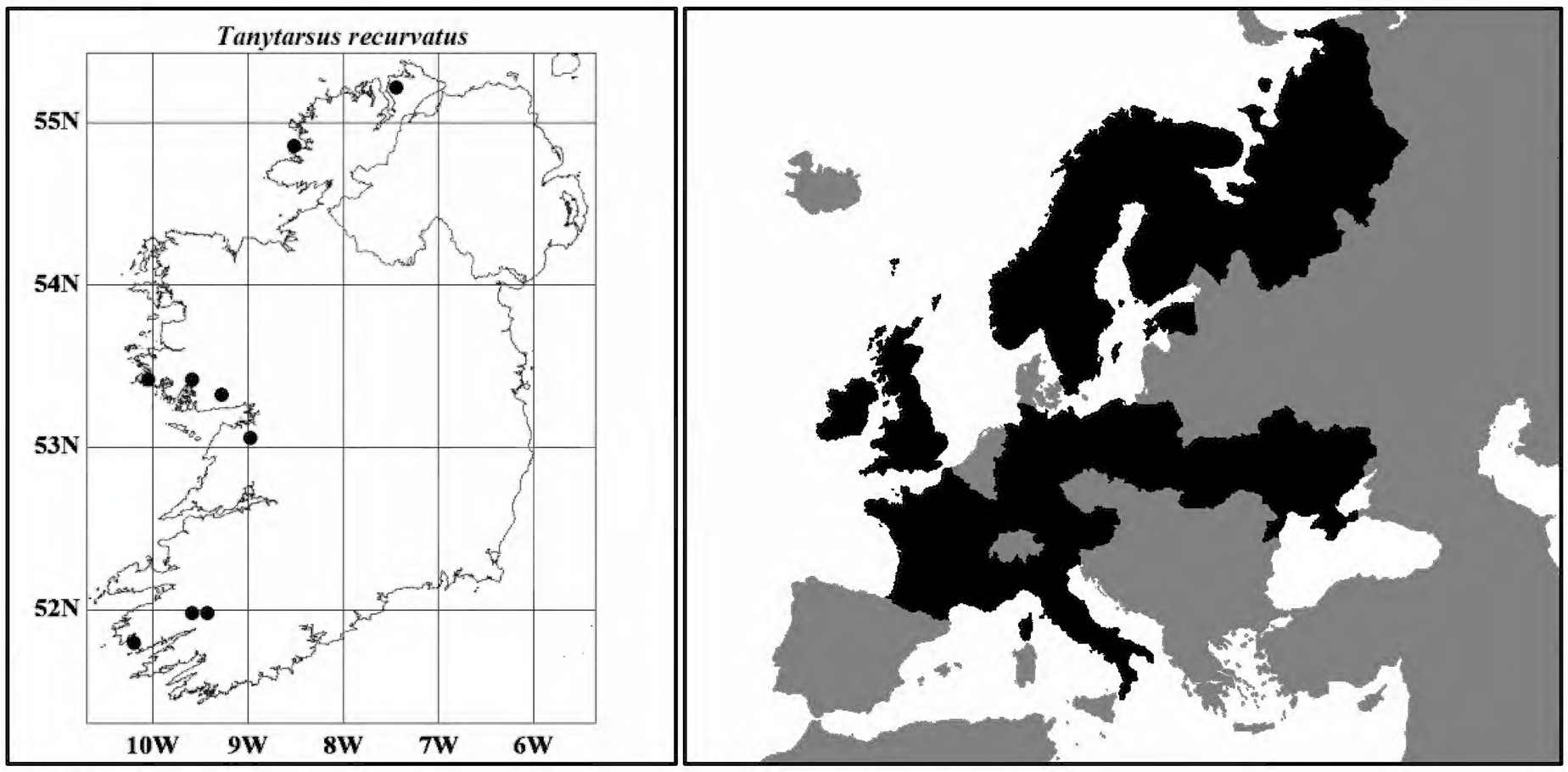
FIGURES 1015-1016. *Tanytarsus palettaris* Verneaux, 1969.



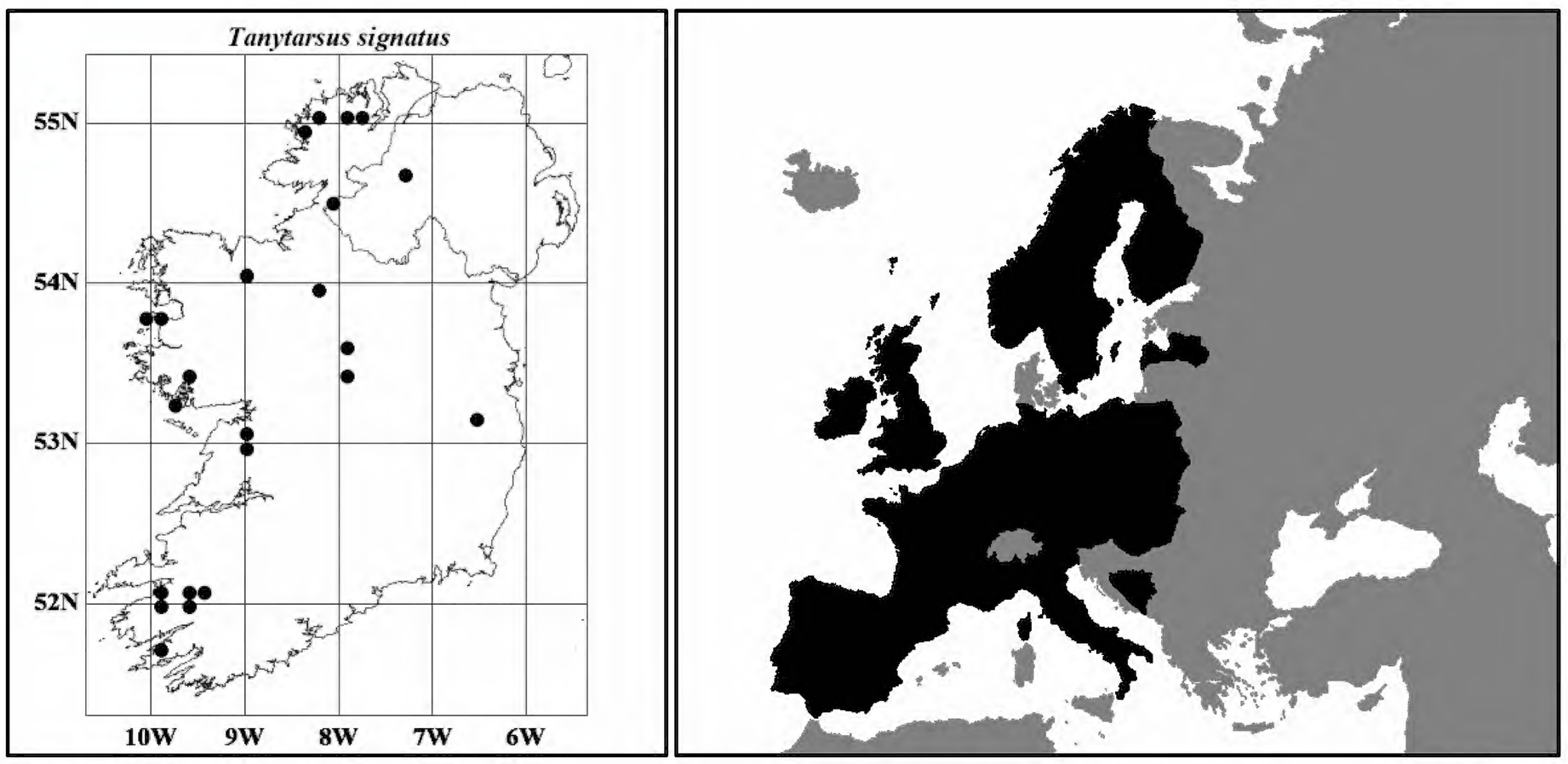
FIGURES 1017-1018. *Tanytarsus pallidicornis* (Walker, 1856).



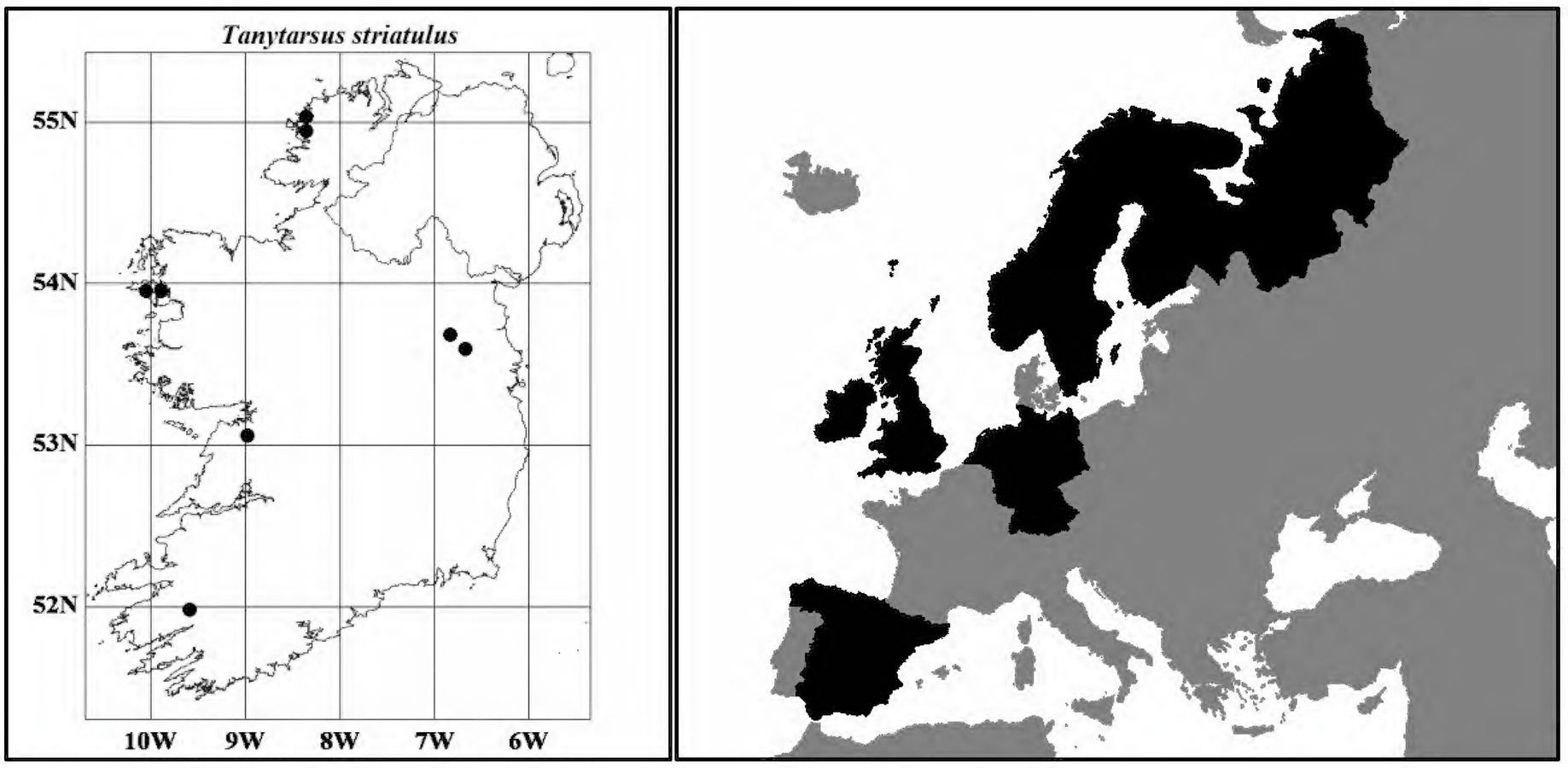
FIGURES 1019-1020. *Tanytarsus quadridentatus* Brundin, 1947.



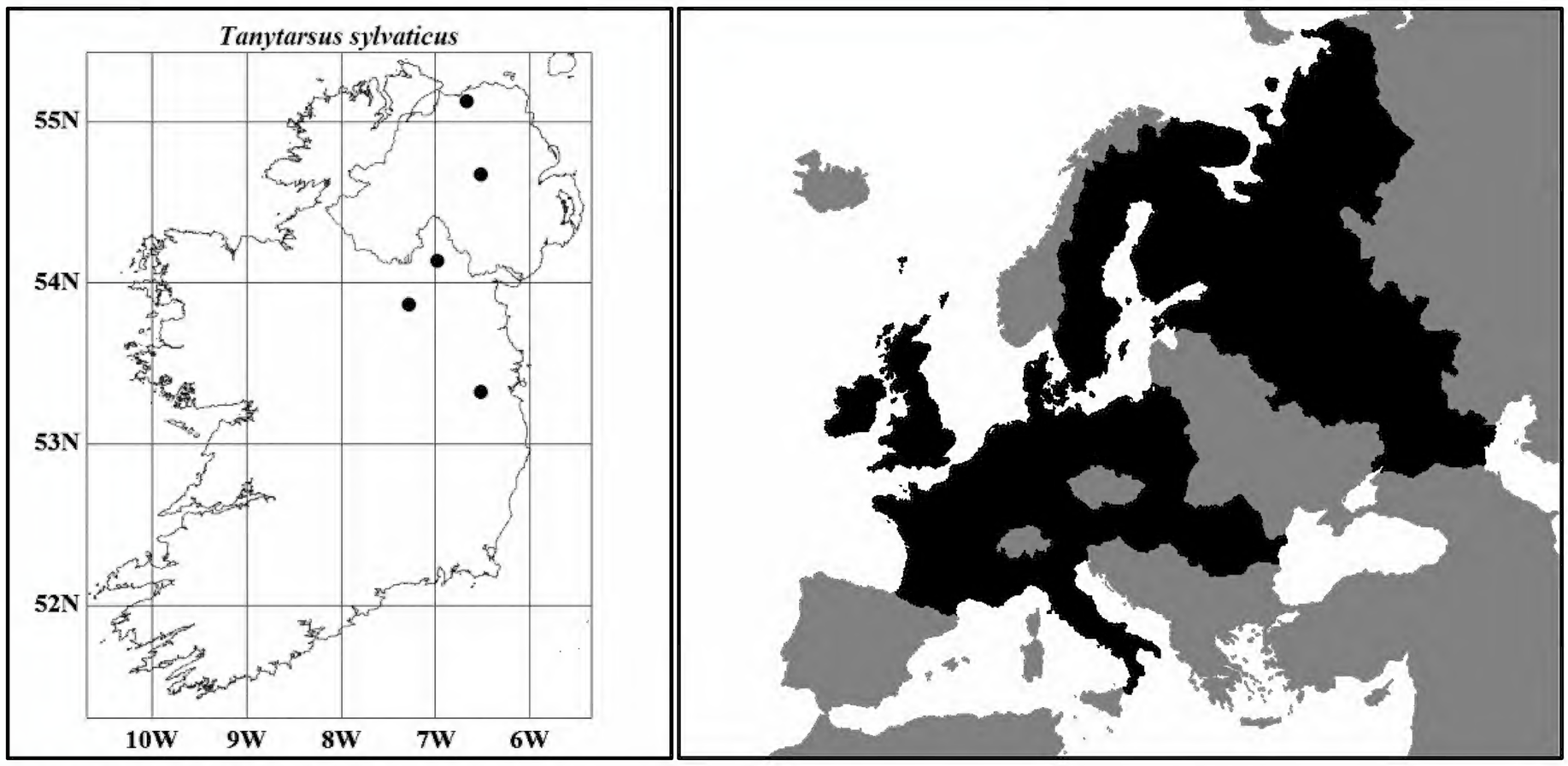
FIGURES 1021-1022. *Tanytarsus recurvatus* Brundin, 1947.



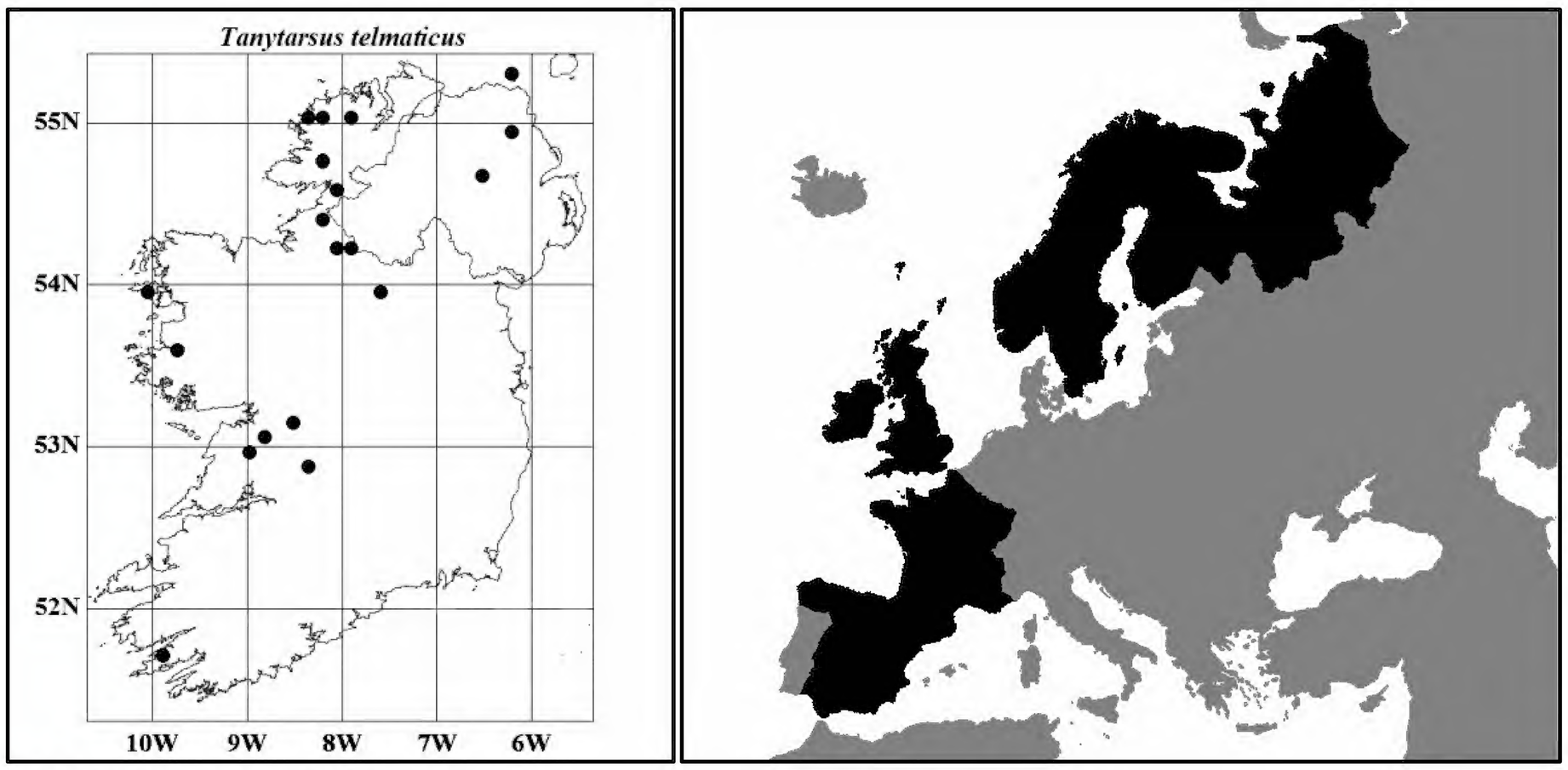
FIGURES 1023-1024. *Tanytarsus signatus* (van der Wulp, 1859).



FIGURES 1025-1026. *Tanytarsus striatulus* Lindeberg, 1976.

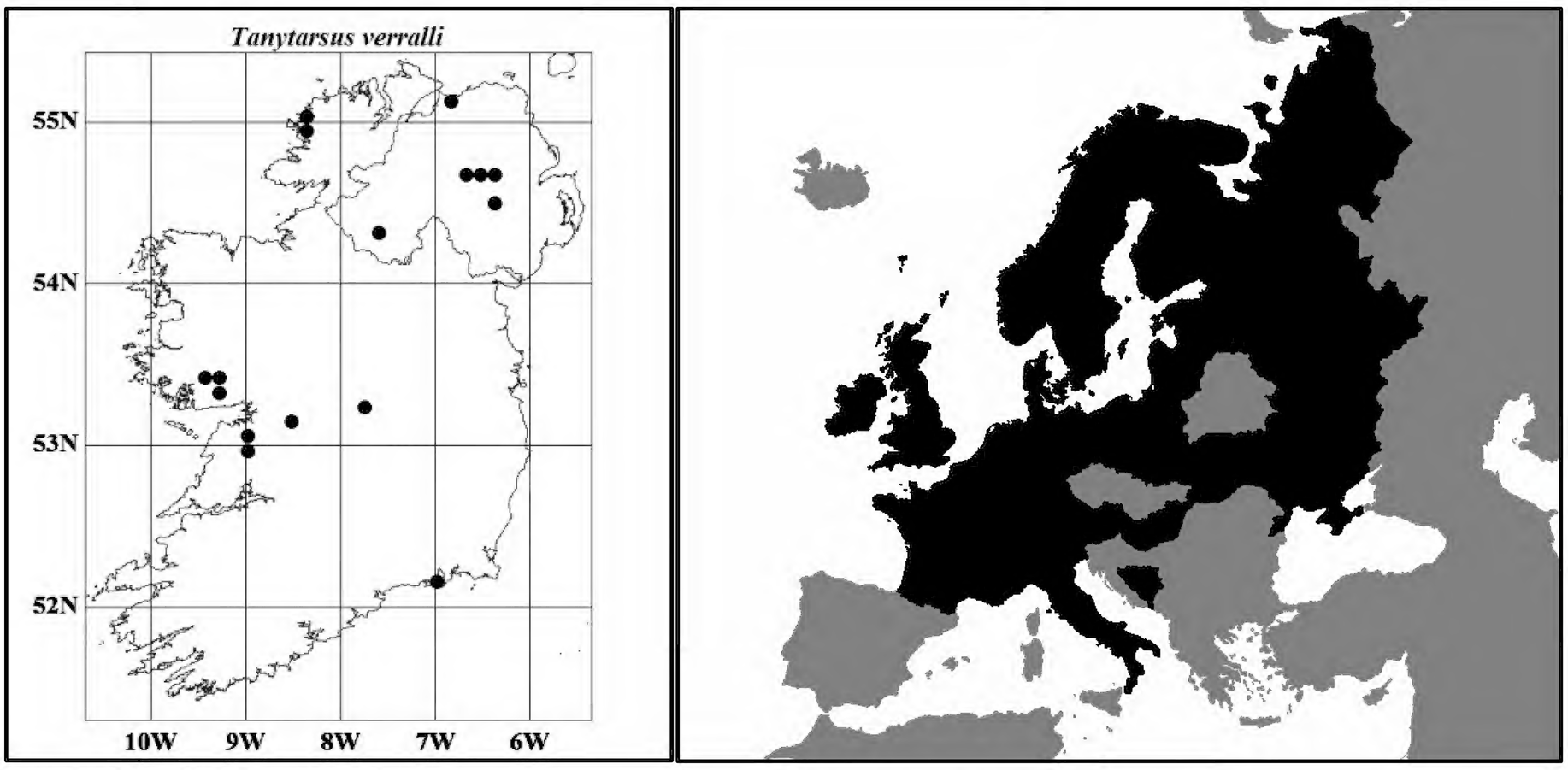


FIGURES 1027-1028. *Tanytarsus sylvaticus* (van der Wulp, 1859).

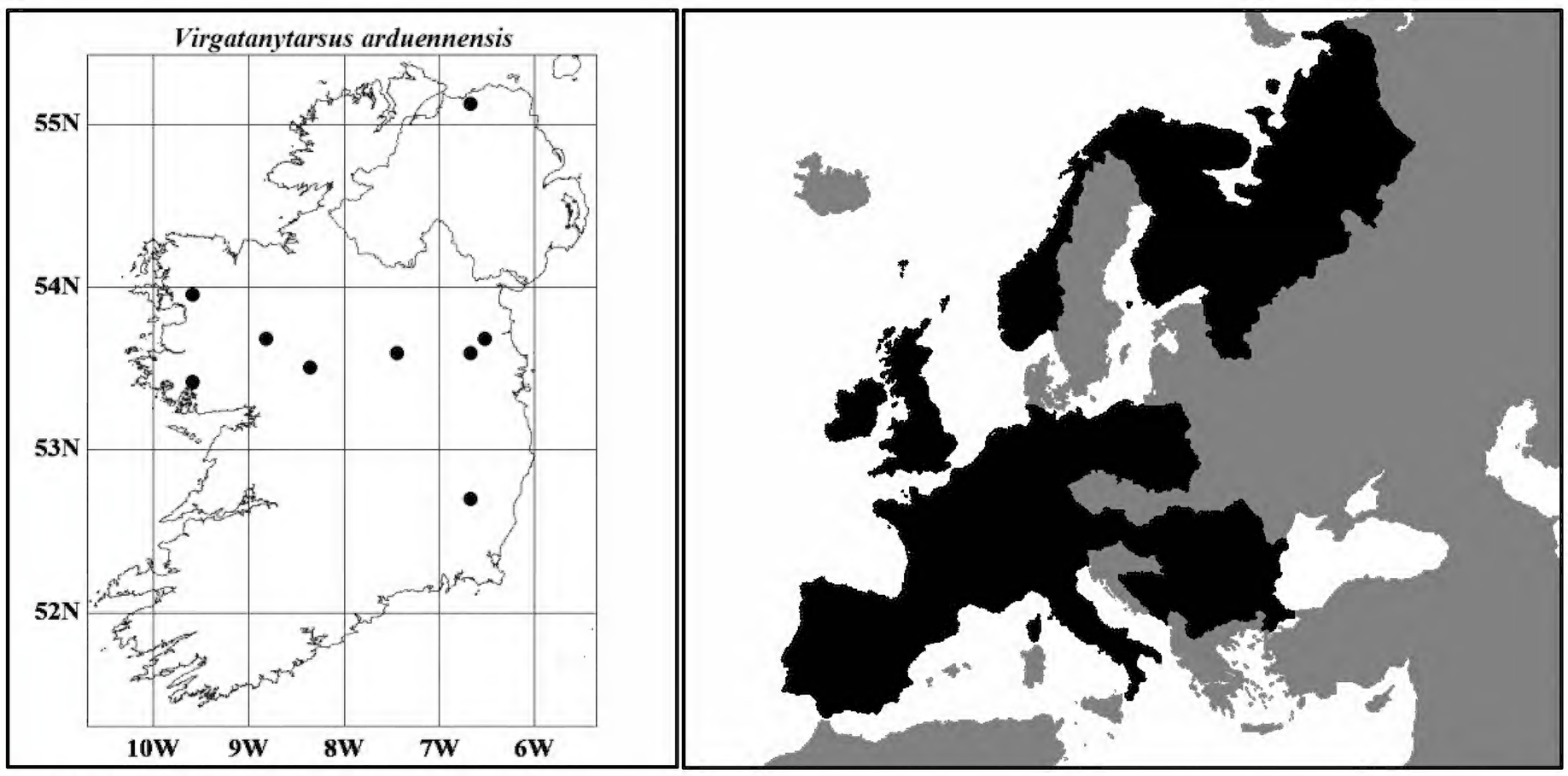


FIGURES 1029-1030. *Tanytarsus telmaticus* Lindeberg, 1959.

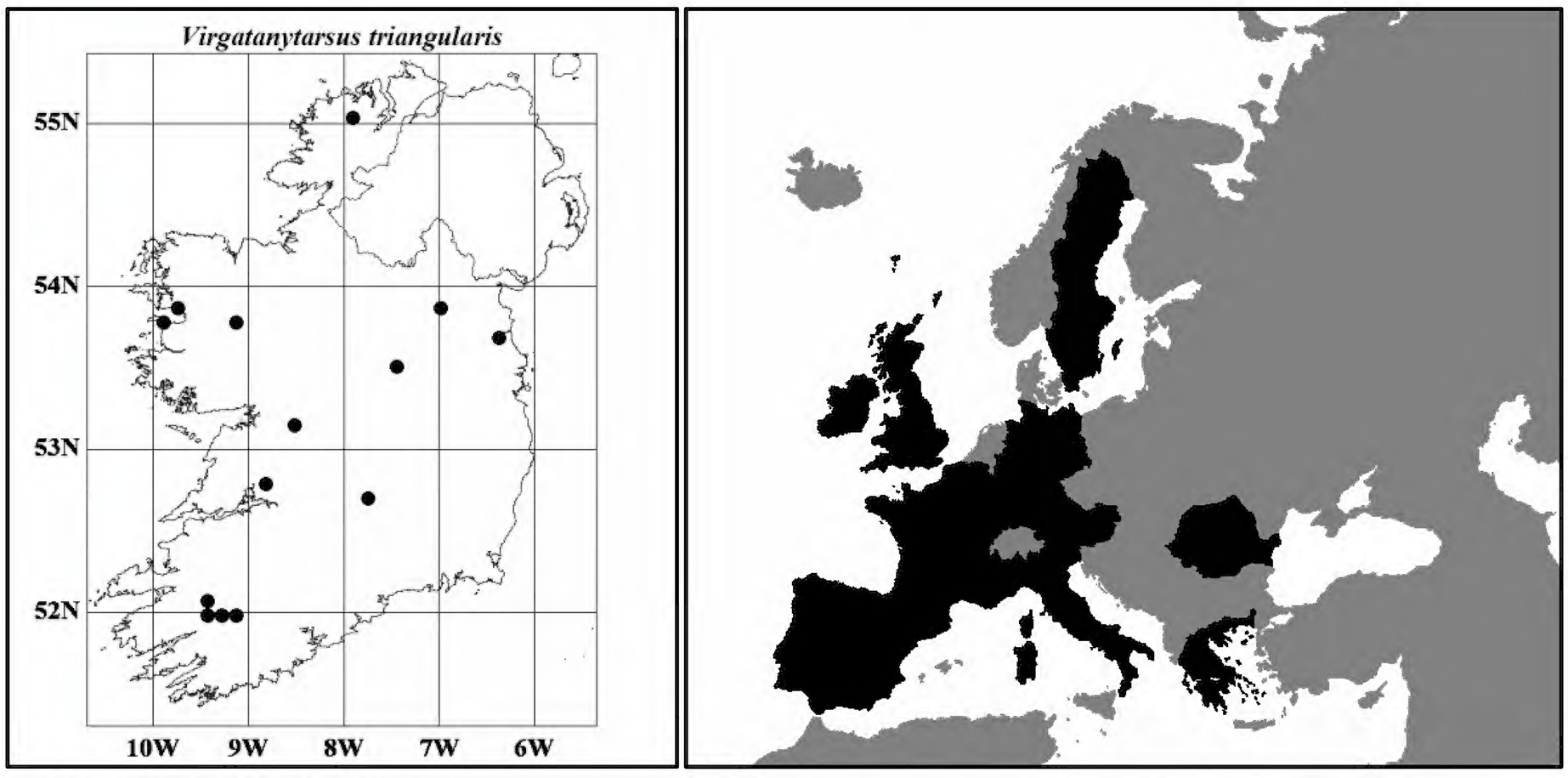
FIGURES 1031-1032. *Tanytarsus usmaensis* Pagast, 1931.



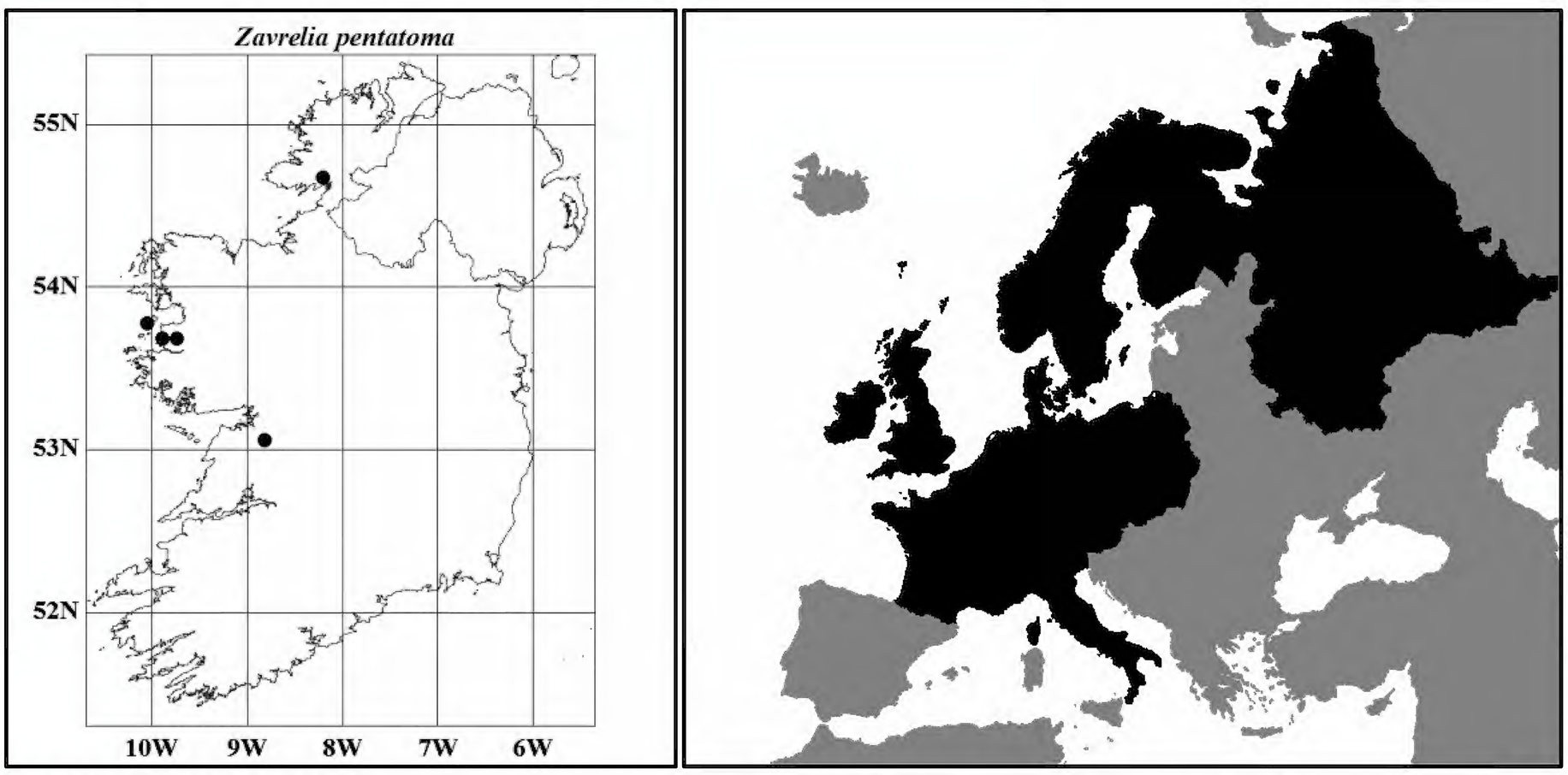
FIGURES 1033-1034. *Tanytarsus verralli* Goetghebuer, 1928.



FIGURES 1035-1036. *Virgatanytarsus arduennensis* (Goetghebuer, 1922).



FIGURES 1037-1038. *Virgatanytarsus triangularis* (Goetghebuer, 1928).



FIGURES 1039-1040. *Zavrelia pentatoma* Kieffer, Thienemann & Bause, 1913.

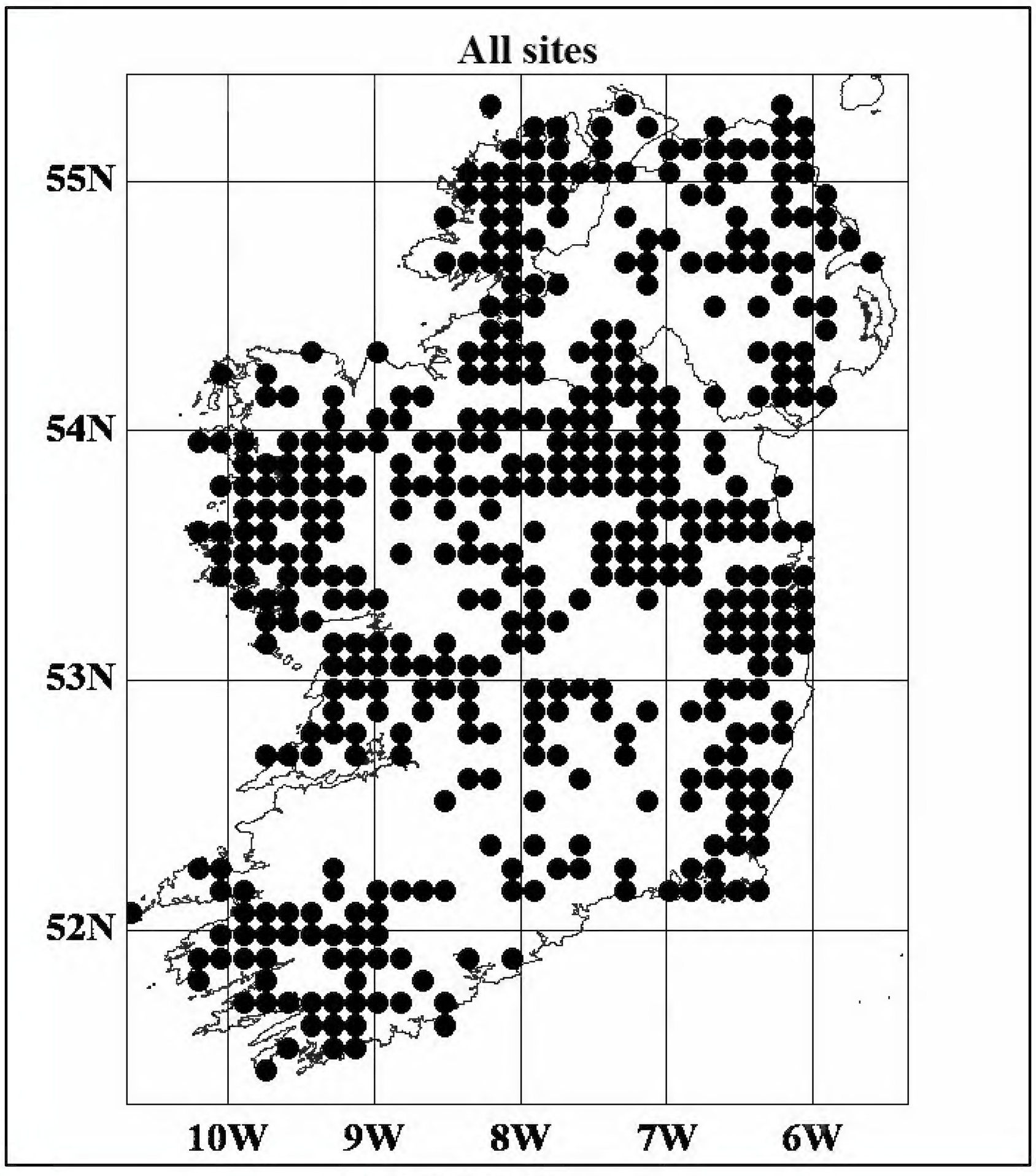


FIGURE 1041. All sites.

References

Andersen, T., Baranov, V., Hagenlund, L. K., Ivković, M., Kvifte, G. M. and Pavlek, M. (2016) Blind flight? A new troglobiotic Orthoclad (Diptera: Chironomidae) from the Lukina Jama – Trojama Cave in Croatia. *PloS ONE* **11**(4): 1-15. e0152884. doi:10.1371/journal.pone.0152884.

Andersen, T., Cranston, P. S., and Epler, J. H. (2013) (eds) The larvae of Chironomidae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. *Insect Systematics & Evolution Supplement* **66**. 573p

Andersen, T. and Sæther, O. A. (1995) The first record of *Buchonomyia* Fittkau and the subfamily Buchonomyiinae from the New World (Diptera: Chironomidae). Pp 363-377. *In* Cranston, P. S. (Ed.) *Chironomids: from genes to ecosystems*. CSIRO, Melbourne, Australia.

Andersen, T., Sæther, O. A., Cranston, P. S. and Epler, J. H. (2013) The larvae of Orthocladiinae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. Pp 189-386. *In* Andersen, T., Cranston, P. S. and Epler, J. H. (eds) The larvae of Chironomidae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. *Insect Systematics & Evolution Supplement* **66**.

Ashe, P. (1982) *Ecological and taxonomic studies on the Chironomidae (Diptera, Nematocera).* Ph.D. thesis. Department of Zoology, University College Dublin.

Ashe, P. (1986) A larval diagnosis for the subfamily Buchonomyiinae and the genus *Buchonomyia* with a description of the 1st instar larva of *Buchonomyia thienemanni* Fittkau (Diptera: Chironomidae) Pp 143-148. *In* Fittkau, E. J. (Ed.) *Beiträge zur Systematik der Chironomidae, Diptera. Spixiana Supplement* **11**.

Ashe, P. (1987) *Lasiodiamesa sphagniocola, Cardiocladius capucinus* and *Orthocladius* (*Eudactylocladius*) *fuscimanus* (Diptera: Chironomidae) new to Ireland. *Irish Naturalists' Journal* **22**: 194-195.

Ashe, P. (1995) Description of a late-instar larva of *Buchonomyia thienemanni* Fittkau and further data on its ecology with diagnoses for the subfamily Buchonomyiinae and the genus *Buchonomyia* (Diptera: Chironomidae). Pp 425-429. *In* Cranston, P. S. (Ed.) *Chironomids: from genes to ecosystems*. CSIRO, Melbourne Australia.

Ashe, P., McCarthy, T. K. and Fahy, S. (2000) The supposed Arctic relict *Corynoneura ambigua* Zetterstedt in Ireland (Diptera: Chironomidae), with a review of its ecology and distribution. *Verhandlungen Internationale Vereinigung für Limnologie* **27**: 267-272.

Ashe, P., Moubayed-Breil, J. and Vondrák, D. (2015a) First records of *Buchonomyia thienemanni* Fittkau (Diptera: Chironomidae) from the Czech Republic. *Chironomus* **27**: 51-53.

Ashe, P. and Murray, D. A. (1980) *Nostococladius*, a new subgenus of *Cricotopus*, (Diptera: Chironomidae). Pp 105-111. *In* Murray, D. A. (Ed.) *Chironomidae: ecology, systematics, cytology and physiology*. Pergamon Press, Oxford.

Ashe, P. and Murray, D. A. (1983) Observations on and descriptions of the eggmass and eggs of *Buchonomyia thienemanni* Fitt. (Diptera: Chironomidae). *Memoirs of the American Entomological Society* **34**: 3 -13.

Ashe, P. and O'Connor, J. P. (1994) *Eukiefferiella ancyla* and *Paratanytarsus grimmi* (Diptera Chironomidae) insects new to Ireland, with a second record for *Orthocladius* (*Symposiocladius*) *lignicola*. *Irish Naturalists' Journal* **24**: 364-366.

Ashe, P. and O'Connor, J. P. (1997) *Metriocnemus cavicola* Kieffer (Dipt. Chironomidae) new to Ireland. *Entomologist's Monthly Magazine* **133**: 76.

Ashe, P. and O'Connor, J. P. (2002) A review of the known associations, commensal, phoretic and ectoparasitic, involving the aquatic stages of Chionomidae (Diptera) with Trichoptera. Pp 467-480. *In* Mey, W. (Ed.) *Proceedings of the 10th International Symposium on Trichoptera, Potsdam, Germany, July30-August 5, 2000. Nova Supplementa Entomologica* **15**.

Ashe, P. and O'Connor, J. P. (2009) *A World Catalogue of Chironomidae (Diptera) Part 1. Buchonomyiinae, Chilenomyiinae, Podonominae, Aphroteniinae, Tanypodinae, Usambaromyiinae, Diamesinae, Prodiamesinae and Telmatogetoninae.* Irish Biogeographical Society and National Museum of Ireland, Dublin. 445pp.

Ashe, P. and O'Connor, J. P. (2012) *A World Catalogue of Chironomidae (Diptera) Part 2. Orthocladiinae.* Irish Biogeographical Society and National Museum of Ireland, Dublin. 968pp.

Ashe, P., O'Connor, J. P. and Murray, D. A. (1998) *A checklist of Irish aquatic insects.* Occasional Publication of the Irish Biogeographical Society **Number 3**: 1-80.

Ashe, P., O'Connor, J. P. and Murray, D. A. (2000) Larvae of *Eurycnemus crassipes* (Panzer) (Diptera: Chironomidae) ectoparasitic on prepupae/pupae of *Hydropsyche siltalai* Döhler (Trichoptera: Hydropsychidae), with a summary of known chironomid/trichopteran associations. *Spixiana* **23**: 267-274.

Ashe, P., O'Connor, J. P. and Murray, D. A. (2015b) A review of the distribution and ecology of *Buchonomyia thienemanni* Fittkau (Diptera: Chironomidae) including a first record for Russia. *European Journal of Environmental Sciences* **5**: 5-11. <http://dx.doi.org /10.14712/23361964.2015.69>

Bond, K. G. M., Nash, R. and O'Connor, J. P. (2006) *An annotated checklist of the Irish butterflies and moths* (*Lepidoptera*). Irish Biogeographical Society and National Museum of Ireland, Dublin. 177 pp.

Bond, K. G. M., O'Connor, J. P. and Ashe, P. (1988) *Limnophyes habilis* and *Metriocnemus atratulus* (Diptera) terrestrial chironomids new to Ireland. *Irish Naturalists' Journal* **22**: 444-445.

Boorman, J., Coluzzi, M., Contini, C., Ferrarese, U., Risovecci, L., Rossaro, B., Saabatini, A. and Wagner, R. (1995) Diptera Culicimorpha. *In* Minelli A., Ruffo, S. and La Posta, S. (eds) *Checklist della specie della fauna Italiana*. **65**. Calderini, Bologna.

Boudewijn, T. J. and Meijer, A. J. M. (2007) de kolonisatie door flora en fauna van betonblokken op het zuidelijk havenhoofd te Ijmuiden. *Bureau Waadenburg, Culemborg, bv*. NOTA WSA **07.06**: 76pp

Bracken, J. J. and Murray, D. A. (1973) Insect emergence data from four small lakes in the south and south-west of Ireland. *Irish Fisheries Investigations* Series A **11**: 1-17.

Brundin, L. (1966) Transantartic relationships and their significance as evidenced by chironomid midges. With a monograph of the subfamilies Podonominae and Aphroteniinae and the austral Heptagyiae. *Kungliga Svenska Vetenskps akademiens Handlingar* **11**: 1-472.

Brundin, L. and Sæther, O. A. (1978) *Buchonomyia burmanica* sp. n. and Buchonomyiinae, a new subfamily among Chironomidae (Diptera). *Zoologica Scripta* **7**: 269-275.

Carter, C. (1975) Emergence periods of the main species of Chironomidae (Diptera) of Lough Neagh. *Irish Naturalists' Journal* **18**: 245-246.

Chandler, P. J., O'Connor, J. P. and Nash, R. (2008) *An annotated checklist of the Irish two-winged flies (Diptera)*. The Irish Biogeographical Society Dublin and National Museum of Ireland, Dublin. 266pp.

Clabby, K. J. and Bracken, J. J. (1976) The Glencullen River survey. *Scientific Proceedings of the Royal Dublin Society* **B (3)**: 355-370.

Cobo, F., Soriano, O. and Baez, M. (2002) Chironomidae Nematocera. *In* Hjort-Andersen, C-T (Ed.) Catálogo de los Diptera de España, Portugal y Andorra (Insecta). *Monografias SEA* **8** Zaragoza.

Coe, R. L. (1950) Family Chironomidae. Pp 121-206 *In* Coe, R. L., Freeman, P. and Mattingly, P. F. (eds) Diptera 2. Nematocera: families Tipulidae to Chironomidae. *Handbooks for the Identification of British Insects* **9** (2).

Contreras-Lichtenberg, R. (2001) Revision der westpaläartischen Arten des Genus *Glyptotendipes* Kieffer, 1913 (Insecta: Diptera, Nematocera, Chironomidae). Teil 2: Sg *Glyptotendipes* s.str Kieffer, 1913 und Sg. *Trichotendipes* Heyn, 1993. *Annalen des naturhistorischen Museums Wien* **103B**: 417-451.

Cranston, P. S. (1982) A key to the larvae of British Orthocladiinae (Chironomidae). *Scientific Publications of the Freshwater Biological Association* **Number 45**: 1-152.

Cranston, P. S. and Ashe, P. (2013a) The larvae of Buchonomyiinae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. Pp 25-28 *In* Andersen, T., Cranston, P. S. and Epler, J. H. (eds) The larvae of Chironomidae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. *Insect Systematics & Evolution*, *Supplement* **66**.

Cranston, P. S. and Ashe, P. (2013b) The larvae of Telmatogetoninae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. Pp 137-144 *In* Andersen, T., Cranston, P. S. and Epler, J. H. (eds) The larvae of Chironomidae (Diptera: Chironomidae) of the Holarctic Region – eys and diagnoses. *Insect Systematics & Evolution Supplement* **66.**

Cranston P. S. and Epler, J. H. (2013) The larvae of Tanypodinae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. Pp 39-136 *In* Andersen, T., Cranston, P. S., and Epler, J. H. (eds) The larvae of Chironomidae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. *Insect Systematics & Evolution*, *Supplement* **66**.

Cranston, P. S., Hardy, N. B. and Morse, G. E. (2012) A dated molecular phylogeny for the Chironomidae (Diptera). *Systematic Entomology* **37**: 172-188.

Cranston, P. S. and Hockin, D. C. (1981) *Halocladius* (*Psammocladius*) *braunsi* (Goetghebuer) (Diptera: Chironomidae): first records of the subgenus and species from Britain and Ireland. *Entomologist's Gazette* **32**: 43-45.

Cranston, P. S. and Krosch, M. N. (2015) DNA sequences and austral taxa indicate generic synonomy of *Paratrichocladius* Santos-Abreu with *Cricotopus* Wulp (Diptera: Chironomidae). *Systematic Entomology* **40**: 719-732.

Cuppen, H., Klink, A. and Moller-Pillot, H. (2009) The larvae of *Graceus ambiguus* and *Sergentia* near *prima* and their identification. *Lauterbornia* **67**: 29-37.

Curran, F. T. C. (2001) *Ecological and ecotoxicological investigations of ongoing discharge of Acid Mine Drainage (AMD) from the abandoned Avoca Copper mines, Co. Wicklow.* Ph.D. Thesis, Department of Zoology, University College Dublin. 329p.

Dettinger-Klemm, P.-M. A. (2001) The metamorphosis of *Orthocladius* (*Symposiocladius*) *holsatus* Goetghebuer, 1937, with the description of *Orthocladius* (*Symposiocladius*) *lunzensis* sp. n. (Diptera: Chironomidae). *Aquatic Insects* **23**: 45-62.

Douglas, D. J. (1975) *The chironomid fauna of the Killarney Valley, Co. Kerry, its distribution, ecology and post glacial history*. Ph.D. thesis. Department of Zoology, University College Dublin. 266pp.

Douglas, D. J. and Murray, D. A. (1980) A checklist of the Chironomidae of the Killarney Valley catchment. Pp 123-129. *In* Murray, D. A. (Ed.) *Chironomidae: ecology, systematics, cytology and physiology*. Pergamon Press, Oxford.

Douglas, D. J. and Murray, D. A. (1987) The Palaeolimnology of Lough Leane, Killarney, Co. Kerry. *Irish Journal of Environmental Science* **IV**: 33-41.

Dowling, C. (1975) *The taxonomy and ecology of the Chironomidae from the Blanket Bogs a) Glenamoy, Co Mayo b) the Fetherbed Mountain, Co Dublin*. Ph.D. thesis. Department of Zoology, University College Dublin. 145pp.

Dowling, C. (1980) Preliminary investigations on the Chironomidae (Insecta, Diptera) from some lotic environments in Iran. Pp 131-137. *In* Murray, D. A. (Ed.) *Chironomidae: ecology, systematics, cytology and physiology*. Pergamon Press, Oxford.

Dowling, C. and Murray, D. A. (1980) *Zalutschia humphriesiae* n.sp., a new species of Orthocladiinae (Diptera, Chironomidae) from Ireland. *Acta Universitas Carolinea* **78**: 49-58.

Dowling, C. and Murray, D. A. (1981) The distribution of the Chironomidae (Diptera) in two Irish blanket bogs. *Proceedings of the Royal Irish Academy* **81B**: 53-61.

Dowling, C., O'Connor, J. P. and O'Grady, M. F. (1981) A baseline survey of the Caragh, an unpolluted river in Southwest Ireland: observations on the macroinvertebrates. *Journal of Life Sciences of the Royal Dublin Society* **2**: 147-159.

Duigan, C. A. (1989) The taxonomy, ecology and distribution of the littoral freshwater *Chydoridae* (Crustacea, Cladocera) of Ireland. Ph.D. thesis. Department of Zoology, University College Dublin.

Duigan, C. A. (1992) The ecology and distribution of the littoral freshwater *Chydoridae* (Branchiopoda, Anomopoda) of Ireland with taxonomic comment on some species. *Hydrobiologia* **241**: 1-70.

Duke, S. (2009) An inspiring zoologist. Pp 114-123. *In* Mulvihill, M. (Ed.) *Labcoats and lace. The lives and legacies of inspiring Irish women scientists and pioneers*. WITS, Dublin. 189pp.

Edwards, F. W. (1929) British non-biting midges (Diptera, Chironomidae). *Transactions of the Entomological Society of London* **77**: 279-364.

Ekrem, T. (2006) A redescription of *Neozavrelia cuneipennis* (Edwards) comb.nov., with a checklist of *Neozavrelia* species of the world (Diptera: Chironomidae). *Zootaxa* **1153**: 1-16.

Ekrem, T., Ashe, P., Andersen, T. and Stur, E. (2017) 35. Chironomidae (Non-biting Midges). Pp 813-863. *In* Kirk-Spriggs, A. H. and Sinclair, B. J. (eds) *Manual of Afrotropical Diptera*. **Volume 2** *Nematocerous Diptera and lower Brachycera.* Suricata 5. South African National Diversity Institute, Pretoria.

Ekrem, T., Willassen, E. and Stur, E. (2010) Phylogenetic utility of five genes for dipteran phylogeny; a test case in the Chironomidae leads to generic synonymies. *Molecular Phylogenetics and Evolution* **57**: 561-571.

Epler, J. H., Ekrem, T. and Cranston P. S. (2013) The larvae of Chironominae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. Pp 387-556. *In* Andersen, T., Cranston, P. S. and Epler, J. H. (eds) The larvae of Chironomidae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. *Insect Systematics and Evolution Supplement* **66**.

Fahy, E. and Murray, D. A. (1972) Chironomidae of a small stream system in western Ireland with a comment on its species composition. *Entomologisk tidskrift* **93**: 148-155.

Fahy, S. M. (2002) *Studies on the aquatic insects of Clare Island, with particular reference to Chironomidae*. Ph.D. thesis. National University of Ireland, Galway.

Fittkau, E. J. (1955) *Buchonomyia thienemanni* n. gen., n.sp. Chironomidenstudien IV (Diptera: Chironomidae). *Beiträge zur Entomologie* **5**: 404-414.

Fittkau, E. J. (1957) *Thienemannimyia* und *Conchapelopia*, zwei neue Gattungen innerhalb der *Ablabesmyia-costalis* - Gruppe (Diptera, Chironomidae) (Chironomiden-studien VII). *Archiv für Hydrobiologie* **53**: 313-322.

Fittkau, E. J. (1962) Die Tanypodinae (Diptera: Chironomidae) Die Tribus Tanypodiini, Macropelopiini und Pentaneurini. *Abhandlung zur Larvalsystematik der Insekten* **6**: 1-453. Akademie Verlag, Berlin.

Fittkau, E. J. and Murray, D. A. (1986) The pupae of Tanypodinae (Diptera: Chironomidae) of the Holarctic region - keys and diagnoses. Pp 31-113. *In* Wiederholm, T. (Ed.) Chironomidae of the Holarctic region - keys and diagnosis. Part 2. Pupae. *Entomologica Scandinavica Supplement* **28**.

Fittkau, E. J. and Murray, D. A. (1988) *Bethbilbeckia floridensis*: a new genus and species Macropelopiini from the South Eastern Nearctic. Pp 253-259. *In* Fittkau, E. J. (Ed.) *Festschrift zu Ehren von Lars Brundin. Spixiana Supplement* **14**.

Fitzgerald, A. M. (1947) *An investigation of the chironomid fauna of the River Dodder (Upper Reaches).* M.Sc. thesis. Department of Zoology, University College Dublin.

Gavin, E. M. (1989) *Ultrastructural studies on the pupal thoracic horn of some Tanypodinae (Diptera: Chironomidae)*. M.Sc. thesis. Department of Zoology, University College Dublin.

Gilka, W. (2011) Six unusual *Cladotanytarsus* Kieffer: towards a systematics of the genus and resurrection of *Lenziella* Kieffer (Diptera: Chironomidae: Tanytarsini). *Zootaxa* **3100**: 1–34.

Goetghebuer, M., Humphries, C. F. and Fitzgerald, A. M. (1949) Metamorphosis of the Chironomidae I. A description of the larvae, pupae and imagines of some members of the genus *Eukiefferiella* (Kieff.) of the larva of *Orthocladius crassicornis* (Goetgh.) and of the imago of *Orthocladius flaveolus* (Goetgh.). *Hydrobiologia* **1**: 410-424.

Grey, M. (1946) *An investigation of the chironomid fauna of the River Dodder (Lower Reaches).* M.Sc. thesis. Department of Zoology, University College Dublin.

Grimshaw, P. H. (1912) The Clare Island Survey 25. Diptera. *Proceedings of the Royal Irish Academy* **31**(25): 1-9.

Haliday, A. H. (1855) Descriptions of insects figured and reference plates illustrating notes on Kerry Insects. *Natural History Review* **2**: 59-64.

Haliday, A. H. (1856) p. 195. *In* Walker, F. *Insecta Britannica, Diptera* **3**. Reeve and Benham, London.

Hayes, B. P. (1991) *Studies on the Chironomidae (Diptera: Insecta) of Irish rivers, based on collections of pupal exuviae*. Ph.D. thesis. Department of Zoology, University College Dublin.

Hayes, B. P. and Murray, D. A. (1988) Diel variation in chironomid emergence and implications for the use of pupal exuviae in river classification. *Verhhandlungen Internationale Vereinigung für Limnologie* **23**: 1261-1266.

Hayes, B. P and Murray, D. A. (1989) Seasonal and yearly variation in chironomid emergence as determined by collections of pupal exuviae in a lowland river in Ireland. *Acta Biologica Debrecina Oecologica Hungarica* **2**: 229-235.

Heneghan. L. (1986) *The Chironomidae (Diptera) of Glenveagh National Park, Co. Donegal: an annotated inventory.* M.Sc. thesis. Department of Zoology, University College Dublin. 147pp.

Heneghan, L. and Murray, D. A. (1987) Additions to the inventory of Irish Chironomidae (Diptera: Insecta). *Irish Naturalists' Journal* **22**: 196-199.

Hrafnsdottir, T. (2005) Diptera 2 (Chironomidae). *The Zoology of Iceland* III **48b**: 1-169.

Humphries, C. F. (1937) Neue Trichocladius-Arten. *Stettin Entomologische Zeitungen* **98**: 185-195.

Humphries, C. F. (1938) The chironomid fauna of the Grosser Plöner See, the relative density of its members and their emergence period. *Archiv für Hydrobiologie* **33**: 535-584

Humphries, C. F. (1951) Metamorphosis of the Chironomidae II - a description of the larva and pupa of *Trichocladius arduus* n.sp. Goetghebuer and of the larva of *Trichocladius trifascia* Edwards. *Hydrobiologia* **3**: 209-216

Humphries, C. F. and Frost, W. E. (1937) The River Liffey Survey. The chironomid fauna of the submerged mosses. *Proceedings of the Royal Irish Academy* **43B**: 161-81.

Kelly-Quinn, M. and Bracken, J. J. (2000) *The distribution of the Ephemeroptera in Ireland*. Occasional Publication of the Irish Biogeographical Society **Number 5**. Published by the Irish Biogeographical Society, Dublin.

Kettani, K., Belqat, B. and El Houari, H. (2010) Les Chironomidés (Diptera, Nematocera) du Parc National de Talassemtane (Rif, Maroc): faunistique et

biogeography. Pp 76-72. *In* Himmi, O. (Ed.) *Actes de la CIFE VI, Traveaux de L'Institut Scientifique, Série Zoologie, Rabat* **47**: 67-72.

Kloet, G. S. and Hincks, W. D. (1975) A checklist of British insects (2nd edition). Part 5 - Diptera and Siphonaptera. *Handbooks for the Identification of British Insects*. **11**(5): 1-139.

Kuper, J. (2017) Life cycle of natural populations of *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton & Cobo, 1997 (Diptera: Chironomidae) in the Netherands: indications for a southern origin? *CHIRONOMUS Journal of Chironomidae Research* **30:** 55-66.

Kuper, J. and Moller Pillot, H. (2012) *Metriocnemus carmencitabertarum*, een nieuwe Dansmug voor Nederland (Diptera: Chironomidae). *Nederlandse Faunistische Mededelingen* **38**: 49-54.

Langton, P. H. (1980) The genus *Psectrocladius* Kieffer (Diptera: Chironomidae) in Britain. *Entomologist's Gazette* **31**: 75-88.

Langton, P. H. (1984) *A key to pupal exuviae of British Chironomidae.* Privately published by the author.

Langton P. H. (1991) *A key to pupal exuviae of West Palaearctic Chironomidae.* Privately published by the author.

Langton, P. H. (2002) A preliminary survey of the non-biting midges (Diptera: Chironomidae) of Northern Ireland. *Bulletin of the Irish Biogeographical Society* **26**: 14-28.

Langton, P. H. (2004a) Additions to the Irish List of Chironomidae (Diptera), including the first species of the millennium new to the British Isles. *Dipterists Digest, Second Series* **10**: 131-134.

Langton, P. H. (2004b) *Anatopynia plumipes* (Fries, 1823) and *Chironomus nudiventris* Ryser, Scholl and Wülker 1983 (Diptera, Chironomidae) new to Britain. *Dipterists Digest, Second Series* **10**: 132.

Langton, P. H. (2005) Six species of Diptera new to Ireland. *Dipterists Digest, Second Series* **12**: 6.

Langton, P. H. (2012a) *Smittia amoena* Caspers (Diptera, Chironomidae new to Ireland. *Dipterist's Digest, Second Series* **19**: 142.

Langton, P. H. (2012b) Records of species of fly (Diptera) for Ireland including two new to the Irish list. *Dipterists Digest, Second Series* **19**: 142.

Langton, P. H. (2013) A new species of *Metriocnemus* van der Wulp (Diptera, Chironomidae) from Northern Ireland. *Dipterists Digest, Second Series* **20**: 181-185.

Langton, P. H. (2015a) *Telmatogeton murrayi* Sæther (Diptera Chironomidae) new to Ireland. *Dipterists Digest, Second Series* **22**: 27.

Langton, P. H. (2015b) The genus *Gymnometriocnemus* (Diptera, Chironomidae) in Northern Ireland. *Dipterists Digest, Second Series* **22**: 28.

Langton, P. H. (2015c) *Metriocnemus ephemerus* sp. nov. (Diptera, Chironomidae) from Northern Ireland. *Dipterists Digest, Second Series* **22**: 35-42.

Langton, P. H., Bitusik, P. and Mitterova, J. (2015) A contribution towards a revision of West Palaearctic *Procladius* Skuse (Diptera: Chironomidae). *Chironomus Journal of Chironomidae Research* **26**: 41-44

Langton, P. H. and Cobo, F. (1997) *Metriocnemus* (*Inermipupa*) *carmencitabertarum* subgen.n., sp.n. (Diptera: Chironomidae) from Spain and Portugal. *Entomologist's Gazette* **48**: 263-271.

Langton, P. H. and Cranston, P. S. (1991) Pupae in nomenclature and identification; West Palaearctic *Orthocladiinae* s. str. (Diptera: Chironomidae) revised. *Systematic Entomology* **16**: 239-252.

Langton, P. H. and Hancock, E. G. (2013) *Telmatogeton murrayi* Sæther and *T. japonicus* Tokunaga (Diptera, Chironomidae) new to Britain. *Dipterists Digest Second Series* **20**: 157-160.

Langton, P. H. and McLarnon, L. A. (1998) *Monodiamesa ekmani* Brundin (Diptera; Chironomidae) confirmed new to Britain and Ireland. *British Journal of Entomology and Natural History* **10**: 196-201.

Langton, P. H. and Pinder, L. C. V. (2007) Keys to the adult male Chironomidae of Britain and Ireland. *Scientific Publications of the Freshwater Biological Association* **Number 64**. Two volumes. Volume 1: 1-239. Volume 2: 1-168.

Langton, P. H. and Ruse, L. P. (2006) Further species of Chironomidae (Diptera) new to the British Isles and data for species newly recorded in the 1998 Checklist. *Dipterists Digest, Second Series* **12**: 135-140.

Langton P. H. and Visser, H. (2003) *Chironomidae exuviae - A key to pupal exuviae of the West Palaearctic Region*. Interactive System for the European Limnofauna Biodiversity Centre of ETI, UNESCO Publishing, Paris.

Langton, P. H. and Wilson, R. S. (2012) *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo (Diptera: Chironomidae) in England. *Dipterists Digest, Second Series* **19**: 141.

Legakis, A. and Murray, D. (2001) Insecta. Pp 323-324. *In* Costello, M. J., Emblow, C. S. and White, R. (eds) European register of marine species. A checklist of the marine species in Europe and a bibliography of guides to their identification. *Patrimoines naturels* **50**.

Lencioni, V. and Marziali, L. (2005) A new species of *Macropelopia* Thienemann from the Italian Alps. *Italian Journal of Zoology* **72**: 317-320.

Malloch, J. R. (1917) A preliminary classification of Diptera, exclusive of Pupipara, based on larval and pupal characters, with keys to the imagines in certain families. *Bulletin of the Illinois State Laboratory of Natural History* (1918) **12**: 161-409.

Marks, R. J. and Henderson, A. E. (1970) An examination of larval Chironomidae in Lennymore Bay, Lough Neagh. *Irish Naturalists' Journal* **16**: 328-334.

McLarnon, L. A. (1997) *Chironomid populations of Lough Neagh with reference to the internal loadings of phosphorus*. D.Phil. thesis. University of Ulster.

McLarnon, L. A. and Carter, C. E. (2000) Chironomidae in Lough Neagh, Northern Ireland. *Verhandlungen Internationale vereinigung für limnologie* **27**: 2383-2387.

Miall, L. C. and Hammond, A. R. (1900) *The structure and life-history of the Harlequin Fly* (*Chironomus*). Clarendon Press, Oxford.

Michiels, S. and Spies, M. (2002) Description of *Conchapelopia hittmairorum* spec. nov. and redefinition of similar western Palaearctic species. *Spixiana* **25**: 251-272.

Moller-Pillot, H. K. M. (2013) *Chironomidae larvae of the Netherlands and adjacent lowlands III. Biology and ecology of the aquatic Orthocladiinae*. KNNV Publishing. 312pp.

Morgan, D. J. (1989) *Emergence patterns of Chironomidae (Diptera) from Glencullen River, Co. Wicklow: determinants, mechanisms and significance*. M.Sc. thesis. Department of Zoology, University College Dublin.

Morgan, D. J. and Murray, D. A. (1988) Five Chironomidae (Diptera) new to Ireland. *Bulletin of the Irish Biogeographical Society* **11**: 95-99.

Morgan, G. (1982) *Chironomidae of the River Bandon*. M.Sc. thesis. Department of Zoology, University College Cork.

Moubayed-Breil, J. and Ashe, P. (2012) An updated checklist of the Chironomidae of Corsica with an outline of their altitudinal and geographical distribution (Diptera). *Ephemera* **13**: 13-39.

Murray, D. A. (1972) A list of the Chironomidae (Diptera) known to occur in Ireland with notes on their distribution. *Proceedings of the Royal Irish Academy* **72B**: 275-293.

Murray, D. A. (1974) Notes on some Chironomidae from the Killarney area, Ireland. *Entomologisk tidskrift Supplementum* **95**: 177-181.

Murray, D. A. (1976a) A new light-weight corer for sampling soft subaquous deposits. *Limnology and Oceanography* **21**: 341-344.

Murray, D. A. (1976b) *Buchonomyia thienemanni* Fittkau, a rare and unusual species (Diptera, Chironomidae) recorded from Killarney, Ireland. *Entomologist's Gazette* **27**: 179-180.

Murray, D. A. (1976c) *Thienemannimyia pseudocarnea* n.sp. a Palaearctic species of the Tanypodinae (Diptera: Chironomidae). *Entomologica Scandinavica* **7**: 191-194.

Murray, D. A. (1980) (Ed.) *Chironomidae: ecology, systematics, cytology and physiology*. Pergamon Press, London. 354pp.

Murray, D. A. (1996) Records of Chironomidae (Diptera) in Ireland: twenty-nine species new to the Irish Fauna. *Bulletin of the Irish Biogeographical Society* **19**: 195-201.

Murray, D. A. (1998) Palaeolimnology in Irish lakes. Pp 19-38. *In* Giller, P. S. (Ed.) *Studies in Irish limnology*. Marine Institute, Dublin.

Murray, D. A. (1999a) Lakes in the landscape, midges, microfossils, sediments and man. 1999 Went Memorial Lecture. *Occasional Publications in Irish Science and Technology* **20**: 1-16. Royal Dublin Society, Dublin.

Murray, D. A. (1999b) Two marine coastal-dwelling Chironomidae (Diptera) new to the fauna of Iceland: *Telmatogeton japonicus* Tokunaga (Telmatogetoninae) and *Clunio marinus* Haliday (Orthocladiinae). *Bulletin of the Irish Biogeographical Society* **23**: 89-91.

Murray, D. A. (2000a) Biodiversity assessment and the Irish Chironomidae (Diptera: Insecta). Pp. 47-58. *In* Rushton, B. (Ed.) *Biodiversity, the Irish dimension.* Royal Irish Academy, Dublin.

Murray, D. A. (2000b) First record of *Telmatogeton japonicus* Tokunaga (Diptera: Chironomidae) from the British Isles and additional records of halobiontic Chironomidae from Ireland. *Entomologist's Monthly Magazine* **136**: 157-159.

Murray, D. A. (2005) Irish Chironomidae (Diptera: Insecta), reference collection and catalogue. Heritage Council, Kilkenny (Project reference WLD/2005/13985).

Murray, D. A. (2006a) Distribution of the Chironomidae (Diptera, Insecta) in Ireland. Heritage Council, Kilkenny (Project reference WLD/2006/14748).

Murray, D. A. (2006b) *Conchapelopia hittmairorum* Michiels and Spies, 2002 (Diptera: Chironomidae, Tanypodinae) new to the Irish faunal checklist. *Bulletin of the Irish Biogeographical Society* **30**: 7-10.

Murray, D. A. (2007) *Limnophyes platystylus* new species (Diptera: Chironomidae, Orthocladiinae) from Ireland. Pp 215-218. *In* Andersen, T. (Ed.) *Contributions to the systematics and ecology of aquatic Diptera: a tribute to Ole A. Sæther*. The Caddis Press, Columbus, Ohio.

Murray, D. A. (2010) Records of Chironomidae (Diptera) in Ireland – twenty additions and notes on four morphotypes. *Bulletin of the Irish Biogeographical Society* **34**: 85-96.

Murray. D. A. (2012a) First record for Ireland of *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo 1997 (Diptera: Chironomidae, Orthocladiinae). *Bulletin of the Irish Biogeographical Society* **36**: 3-7.

Murray. D. A. (2012b) Four Chironomidae (Diptera) new to Ireland in the subfamilies Orthocladiinae and Chironominae and a new site record for *Parochlus kiefferi* (Garrett, 1925) (Podonominae). *Bulletin of the Irish Biogeographical Society* **36**: 8-14.

Murray, D. A. (2012c) Records of the pupal morphotype *Macropelopia* spec Norwegen *sensu* Fittkau 1962 (Diptera, Chironomidae) from Ireland and Iceland. *Dipterists Digest, Second Series* **19**: 157-160.

Murray, D. A. (2013) Supplementary records of *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo, 1997 (Diptera: Chironomidae) in Ireland with some observations on larval behaviour. *Bulletin of the Irish Biogeographical Society* **37**: 204-207.

Murray, D. A. (2014) First records of halophilic Chironomidae (Diptera) from Lanzarote, including *Clunio marinus* Haliday (Orthocladiinae) new to the Canary Islands. *Bulletin of the Irish Biogeographical Society* **38**: 247-250.

Murray, D. A. (2015a) Records of Chironomidae (Diptera) from Co. Meath including *Rheotanytarsus reissi* Lehmann, 1970 (Tanytarsini) new to Ireland. *Bulletin of the Irish Biogeographical Society* **39**: 3-6.

Murray, D. A. (2015b) *Glyptotendipes* (*Heynotendipes*) *signatus* (Kieffer, 1909) and *Harnischia fuscimanus* Kieffer, 1921 (Diptera, Chironomidae) new to Ireland. *Dipterists Digest, Second Series* **22**: 16.

Murray, D. A. (2015c) *The Chironomidae* (*Diptera*) *of Ireland* dataset, Biodiversity Maps added on 11 March 2015. <http://maps.biodiversityireland.ie/#/DataSet/199>

Murray, D. A. (2015d) Two marine Orthocladiinae (Diptera: Chironomidae) from the Algarve – first records of *Halocladius* (*Halocladius*) *millenarius* and *Thalassosmittia thalassophila* for Portugal. *Bulletin of the Irish Biogeographical Society* **39**: 209-211.

Murray, D. A. (2016a) An annotated inventory of the Chironomidae (Insecta: Diptera) of County Meath, Ireland. *Bulletin of the Irish Biogeographical Society* **40**: 18-42.

Murray, D. A. (2016b) Records of some freshwater and halobiontic Chironomidae (Insecta: Diptera) from County Cork, Ireland. *Bulletin of the Irish Biogeographical Society* **40**: 125-130.

Murray, D. A. (2016c) *Baeotendipes noctivagus* (Kieffer, 1911) (Diptera, Chironomidae) from Ireland – new to the British Isles. *Dipterists Digest, Second Series* **23**: 162.

Murray, D. A. (2016d) A new record of *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo (Orthocladiinae) from England. *Chironomus Journal of Chironomidae Research* **29**: 43-44.

Murray, D. A. (2017a) Some Chironomidae (Insecta, Diptera) from south east Ireland – new and additional records for County Wexford and Hydrometric Areas 11 and 12. *Bulletin of the Irish Biogeographical Society* **41**: 22-32.

Murray, D. A. (2017b) The Chironomidae (Insecta: Diptera) of Achill Island, County Mayo – new records and checklist. *Bulletin of the Irish Biogeographical Society* **41**: 90-102.

Murray, D. A. (2017c) A second record in Ireland of *Metriocnemus ephemerus* Langton 2015 (Diptera: Chironomidae). *Dipterists Digest, Second Series* **24**: 155.

Murray, D. A. and Ashe, P. (1981a) A description of the pupa of *Buchonomyia thienemanni* Fittkau with notes on its ecology and on the phylogenetic position of the subfamily *Buchonomyiinae* (Diptera, Chironomidae). *Spixiana* **4**: 55-68.

Murray, D. A. and Ashe, P. (1981b) A description of the larva and pupa of *Eurycnemus crassipes* (Panzer) (Diptera: Chironomidae). *Entomologica Scandinavica* **12**: 357-361.

Murray, D. A. and Ashe, P. (1982) First records of the subfamilies Podonominae and Telmatogetoninae (Diptera: Chironomidae) from Ireland. *Irish Naturalists' Journal* **20**: 546-547.

Murray, D. A. and Ashe, P. (1983) An inventory of the Irish Chironomidae (Diptera). *Memoirs of the American Entomological Society* **34**: 223-233.

Murray, D. A. and Ashe, P. (1986) A description of the adult female of *Buchonomyia thienemanni* Fittkau and a re-assessment of the phylogenetic position of the subfamily Buchonomyiinae (Diptera, Chironomidae). Pp 149-160. *In* Fittkau, E. J. (Ed.) *Beiträge zur Systematik der Chironomidae, Diptera. Spixiana Supplement* **11**.

Murray, D. A. and Ashe, P. J. (2017) Additional distribution records of Chironomidae (Insecta: Diptera) in Ireland from recent and past collections. *Bulletin of the Irish Biogeographical Society* **41**: 112-129.

Murray, D. A. and Baars, J. R. (2006a) Four Chironomidae (Diptera, Insecta) new to Ireland from remote upland lakes. *Bulletin of the Irish Biogeographical Society* **30**: 298-301.

Murray, D. A. and Baars, J. R. (2006b) *Parapsectra uliginosa* Reiss, 1969 (Diptera, Chironomidae) new to Ireland and association of exuviae of *Procladius* Pe1 (*sensu* Langton) with *P. simplicistilus* Freeman, 1948. *Dipterists Digest, Second Series* **13**: 166-168.

Murray, D. A. and Fittkau, E. J. (1986) *Hayesomyia* n. gen. a new genus of Tanypodinae from the Holarctic (Diptera: Chironomidae). Pp 195-207. *In* Fittkau, E. J. (Ed.) *Beiträge zur Systematik der Chironomidae, Diptera. Spixiana Supplement* **11**.

Murray D. A. and Fittkau, E. J. (1989) The adult males of Tanypodinae (Diptera: Chironomidae) of the Holarctic region - keys and diagnoses. Pp 36-123. *In* Wiederholm, T. (Ed.) Chironomidae of the Holarctic region - keys and diagnosis. Part 3. Adult males. *Entomologica Scandinavica Supplement* **34**.

Murray, D. A. and Hughes, S. (2000) New records of marine Chironomidae (Diptera) from Madeira. Pp 575-588. *In* Hoffrichter, O. (Ed.) *Late 20th Century Research on Chironomidae.* Shaker Verlag, Achen.

Murray, D. A., Hughes, S. J., Furse, M. T. and Murray, W. (2004) New records of Chironomidae (Diptera: Insecta) from the Azores, Macaronesia. *Annales de Limnologie* **40**: 33-42.

Murray, D. A., Langton, P. H., O'Connor, J. P. and Ashe. P. J. (2013) Distribution records of Irish Chironomidae (Diptera): Part 1 – Buchonomyiinae, Podonominae, Tanypodinae, Telmatogetoninae, Diamesinae and Prodiamesinae. *Bulletin of the Irish Biogeographical Society* **37**: 208-336.

Murray, D. A., Langton, P. H., O'Connor, J. P. and Ashe, P. J. (2014) Distribution records of Irish Chironomidae (Diptera): Part 2 - Orthocladiinae. *Bulletin of the Irish Biogeographical Society* **38**: 61-246.

Murray, D. A., Langton, P. H., O'Connor, J. P. and Ashe, P. J. (2015) Distribution records of Irish Chironomidae (Diptera): Part 3 - Chironominae. *Bulletin of the Irish Biogeographical Society* **39**: 7-192.

Murray, D. A. and Murray, W. A. (2003) A reassessment of Chironomidae (Diptera) of Clare Island, Co. Mayo, with first records of *Acamptocladius reissi* Cranston and Sæther and *Limnophyes angelicae* Sæther (Orthocladiinae) for the Irish faunal checklist. *Bulletin of the Irish Biogeographical Society* **27**: 255-269.

Murray, D. A. and Murray, W. A. (2006) Notes on six Chironomidae (Diptera: Insecta) new to Ireland from Co. Mayo. *Bulletin of the Irish Biogeographical Society* **30**: 293-297.

Murray, D. A. and O'Connor, J. P. (1982) *Microchironomus deribae* (Freeman) (Diptera, Chironomidae) a fuel contaminant in an Irish helicopter. *Entomologist's Monthly Magazine* **118**: 44.

Murray, D. A. and O'Connor, J. P. (1992) Observations on the distribution of some chironomids (Diptera) and caddisflies (Trichoptera) in the Killarney area, Ireland. *Netherlands Journal of Aquatic Ecology* **26**: 393-396.

Murray, D. A. and O'Connor, J. P. (2012) *Rheotanytarsus rioensis* Langton and Armitage (Diptera, Chironomidae) new to Ireland from specimens collected in 1973-5. *Dipterists Digest, Second Series* **19**: 161.

Murray, D. A., O'Connor, J. P and Ashe, P. (1999) Obituary: Carmel F. Humphries, Ph.D., D.Sc., R.I.A. *Bulletin of the Irish Biogeographical Society* **23**: 162-164.

Murray, D. A., O'Connor, J. P. and Ashe, P. (2016) A contribution to the Fauna Europaea Database – additions and amendments to the inventory of Irish Chironomidae (Diptera: Insecta) from the Republic of Ireland and Northern Ireland. *Bulletin of the Irish Biogeographical Society* **40**: 131-141.

Neumann, D. (1976) Adaptations of chironomids to intertidal environments. *Annual Review of Entomology* **21**: 387-414.

O'Connor, J. P. (2015) *A catalogue and atlas of the caddisflies (Trichoptera) of Ireland.* Occasional Publication of the Irish Biogeographical Society **Number 11**. Published by the Irish Biogeographical Society in association with the National Museum of Ireland, Dublin.

Omoku, C. C. (1986) *A comparative survey of the pupal respiratory organ of some Tanypodinae (Diptera: Chironomidae) based on Scanning Electron Microscopy*. Ph.D. thesis, Department of Zoology, University College Dublin. 250pp.

Paasivirta, L. (2012) Finnish Chironomidae. *Chironomus Journal of Chironomidae Research* **25**: 47-70.

Palmén, E. (1968) The Second International Symposium of Chironomid Research, Helsinki 1967. *Annales Zoologici Fennici* **5**: 1-5.

Pinder, L. C. V. (1978) A key to the adult males of the British Chironomidae (Diptera) the non-biting midges. *Scientific Publications of the Freshwater Biological Association* **Number 37**. Two volumes. Volume 1: pp 1-169. Volume 2: figs 77-189.

Pinder, L. C. V. and Cranston, P. (1976) Morphology of the male imagines of *Orthocladius* (*Pogonocladius*) *consobrinus* and *O. glabripennis* with observations on the taxonomic status of *O. glabripennis*. *Entomologica Scandinavica* **7**: 19-23.

Rainio, J., Passivirta, L. and Brodin, Y. (2009) Marine midge *Telmatogeton japonicus* Tokunaga (Diptera: Chironomidae) exploiting brackish waters in Finland. *Aquatic Invasions* **4**: 405-408 (DOI 10.3391/ai.2009 4.2.20).

Reilly, S. (1951) *The macrofauna of the River Dodder*. M.Sc. thesis. Department of Zoology, University College Dublin.

Reiss, F. (1968) Ökologische und systematische Untersuchungen an Chironomiden (Diptera) des Bodensees. Ein Beitrag zur lakustrichen Chironomiden fauna des nördlichen Alpenvorlands. *Archiv für Hydrobiologie* **64**: 176-323.

Roback, S. S. (1971) The adults of the subfamily Tanypodinae (= Pelopiinae) in North America (Diptera: Chironomidae). *The Academy of Natural Sciences of Philadelphia.* **Monograph 17**. 417pp.

Roback, S. S. (1980) The immature chironomids of the Eastern United States IV. Tanypodinae-Procladiini. *Proceedings of the Academy of Natural Sciences of Philadelphia* **132**: 1-63.

Rossaro, B. and Casalengo, C. (2001) Description of the pupal exuviae of some species belonging to *Orthocladius* s. str. van der Wulp, 1874 (Diptera: Chironomidae: Orthocladiinae), with a new key to species of West Palaearctic region. *Zootaxa* **7**: 1-20.

Rossaro, B., Lencioni, V. and Casalengo, C. (2003) Revision of West Palaearctic species of *Orthocladius*. s.str. van der Wulp, 1874 (Diptera: Chironomidae:

Orthocladiinae), with a new key to species. *Studi Trentini di Scienze Naturali - Acta Biologica* **79**: 213-241.

Rossaro, B. and Prato, S. (1991) Description of six new species of the genus *Orthocladius* (Diptera, Chironomidae). *Fragmenta Entomologica* **23**: 59-68.

Sæther, O. A. (1976) Revision of *Hydrobaenus*, *Trissocladius*, *Zalutschia*, *Paratrissocladius* and some related genera (Diptera: Chironomidae). *Bulletin of the Fisheries Research Board of Canada* **195**. 287pp.

Sæther, O. A. (1983) The canalised evolutionary potential - inconsistencies in phylogenetic reasoning. *Systematic Zoology* **32**: 343-359.

Sæther. O. A. (1989) Phylogenetic trends and their evaluation in chironomids with special reference to orthoclads. *Acta Biologica Debrecina Oecologica Hungarica* **2**: 53-75.

Sæther, O. A. (1990) A review of the genus *Limnophyes* Eaton from the Holarctic and Afrotropical regions (Diptera: Chironomidae, Orthocladiinae). *Entomologica Scandinavica Supplement* **35**: 1-135.

Sæther, O. A. (2000) Phylogeny of the subfamilies of Chironomidae (Diptera). *Systematic Entomology* **25**: 393-403.

Sæther, O. A. (2004) Three new species of *Orthocladius* subgenus *Eudactylocladius* (Diptera: Chironomidae) from Norway. *Zootaxa* **508**: 1-12.

Sæther, O. A. (2005) A new subgenus and new species of *Orthocladius* van der Wulp with a phylogenetic evaluation of the validity of the subgenera of the genus (Diptera: Chironomidae). *Zootaxa* **974**: 1-56.

Sæther, O. A. (2009) *Telmatogeton murrayi* sp.n. from Iceland and *T. japonicus* from Madeira (Diptera: Chironomidae). *Aquatic Insects* **31**: 31-44.

Sæther, O. A. and Andersen, T. (2013) The larvae of Podonominae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. Pp 29-38. *In* Andersen, T., Cranston, P. S. and Epler, J. H. (eds) The larvae of Chironomidae (Diptera) of the Holarctic Region – keys and diagnoses. *Insect Systematics & Evolution Supplement* **66.**

Sæther, O. A., Ashe, P. and Murray, D. A. (2000) Family Chironomidae. Pp 113-334. *In* Papp, L. and Darvas, B. (eds) *Contributions to a manual of Palaearctic Diptera* (*with special reference to the flies of economic importance*) **4** A6. Science Herald, Budapest.

Sæther, O. A. and Ferrington, L. C. (2003) Nomenclature notes on some orthoclads (Diptera: Chironomidae). *Zootaxa* **322**: 1-7.

Sæther, O. A. and Sublette, J. E. (1983) A review of the genera *Doithrix* n.gen., *Georthocladius* Strenzke, *Parachaetocladius* (Wülker) and *Pseudorthocladius* Goetghebuer (Diptera: Chironomidae Orthocladiinae). *Entomologica Scandinavica Supplement* **20**: 1-100.

Seredzus, F. and Wichard, W. (2003) Buchonomyiinae (Diptera, Chironomidae) in Baltic Amber. *Studia Dipterologica* **9**: 393-402.

Silva, F. L. and Ekrem, T. (2015) Phylogenetic relationships of nonbiting midges in the subfamily Tanypodinae (Diptera: Chironomidae) inferred from morphology. *Systematic Entomology* (2015) (DOI: 10.1111/syen.12141).

Soponis, A. R. (1990) A review of the Holarctic species of *Orthocladius* (*Euorthocladius*) (Diptera: Chironomidae). *Spixiana Supplement* **13**: 1-56.

Spies, M. (2005) On selected family-group names in Chironomidae (Insecta, Diptera), and related nomenclature. *Zootaxa* **894**: 1-12.

Spies, M. and Bolton, S. J. (2013) On the first record from Britain of *Parachironomus elodeae* (Townes) (Diptera, Chironomidae). *Dipterists Digest, Second Series* **20**: 1-7.

Spies, M. and Dettinger-Klemm, A. (2015) Diagnoses for *Nubensia*, n.gen. (Diptera, Chironomidae, Chironomini), with the first full descriptions of the adult female and larva of *N. nubens* (Edwards, 1929). *Zootaxa* **3994**: 109-121.

Spies, M. and Sæther, O. A. (2004) Notes and recommendations on taxonomy and nomenclature of Chironomidae, (Diptera). *Zootaxa* **752**: 1-90. <www.mapress.co. /zootaxa/2004f/ zt00752.pdf.>

Spies, M. and Sæther, O. A. (2013) Chironomidae. Fauna Europaea: Chironomidae. *In* Beuk, P. and Pape, T. (eds) *Diptera Nematocera. Fauna Europaea version **2.6***. Internet database: <http://www.faunaeur.org/>

Stur, E. and Ekrem, T. (2006) A revision of West Palaearctic species of the *Micropsectra atrofasciata* species group (Diptera: Chironomidae). *Zoological Journal of the Linnean Society* **146**: 165-225.

Thienemann, A. (1910) Das sammeln von Puppenhäuten der Chironomiden. *Archiv für Hydrobiologie* **6**: 213-214.

Tokeshi, M. (1986) Population ecology of the commensal chironomid *Epoicocladius flavens* on its mayfly host *Ephemera danica*. *Freshwater Biology* **16**: 235-243.

Tokeshi, M. (1990) Chironomid fauna of Lough Neagh, Northern Ireland (Diptera: Chironomidae). *Entomologist's Gazette* **41**: 145-148.

Trodd. W. R. (2003) *Assessment of aquatic habitats in Turraun Nature reserve for restoration management and use of Chironomidae (Diptera: Insecta) as indicators of water quality.* Ph.D. thesis. Department of Zoology, University College Dublin.

Trodd, W. R. and Murray, D. A. (2004) *Cryptotendipes pflugfelderi* Reiss, 1964 (Diptera, Chironomidae) in the Turraun Nature Reserve and the first record from Ireland. *Entomologist's Gazette* **55**: 171-172.

Vallendunk, H. J. and Moller-Pillot, H. K. M. (2007) *Chironomidae I: larvae of the Netherlands and adjacent Lowlands. General ecology and Tanypodinae*. KNNV Publishing, Netherlands.

Vallendunk, H. J. and Morozova, E (2005) *Cryptochironomus*. An identification key to the larvae and pupal exuviae in Europe. *Lauterbornia* **55**: 1-22. Dinkelsherben, 2005-08-19.

Walker, F. (1856) *Insecta Britannica, Diptera* **3**. Lovell and Reeve, London. 352pp.

Wiederholm, T. (Ed.) (1983) Chironomidae of the Holarctic Region. Keys and diagnoses. Part 1. Larvae. *Entomologica Scandinavica Supplement* **Number 19**: 1-457.

Wiederholm, T. (Ed.) (1986) Chironomidae of the Holarctic Region. Keys and diagnoses. Part 2. Pupae. *Entomologica Scandinavica Supplement* **Number 28**: 1-482.

Wiederholm, T. (Ed.) (1989) Chironomidae of the Holarctic Region. Keys and diagnoses. Part 3. Adult males. *Entomologica Scandinavica Supplement* **Number 34**: 1-532.

Wilhelmsson, D. and Malm, T. (2008) Fouling assemblages on offshore wind power plants and adjacent substrata. *Estuarine, Coastal and Shelf Science* **79**: 459-466. <http:11dx.doi.org/10.1016/j.ecss 2008.04.020>

Wilson, R. S. and Ruse, L. P. (2005) A guide to the identification of genera of chironomid pupal exuviae occurring in Britain and Ireland (including common genera from northern Europe) and their use in monitoring lotic and lentic waters. *Freshwater Biological Association, Special Publication* **13**: 1-176.

Yerbury, J. W. (1902) A list of the Diptera met with in Cork and Kerry during the summer of 1901. *Irish Naturalist* **11**: 74-93.

Endpieces

PLATE 21. Peter Cranston.

PLATE 22. Lars Brundin (on the right).

Peter Cranston was collecting *Buchonomyia thienemanni* in Killarney, 2001. Declan Murray is also present in both photographs.

PLATE 23. 2006. The authors Declan Murray, James O'Connor and Patrick Ashe at the 16th International Symposium on Chironomidae in Funchal, Madeira.

PLATE 24. Declan Murray with Ole Sæther at the 25th SIL Congress, Munich, 1989.

PLATE 25. Patrick Ashe with Friedrich Reiss in discussion following the 13th International Symposium on Chironomidae in Freiburg, 1997.

and *finally*

FIGURE 1042. The male hypopygium of *Limnophyes platystylus* Murray.

SYSTEMATIC INDEX

Taxa: valid genera, subgenera and species in bold; **(s.g.)** = subgenus.
Page numbers: ordinary type – checklist; **bold** – main entry; *italics* – atlas.

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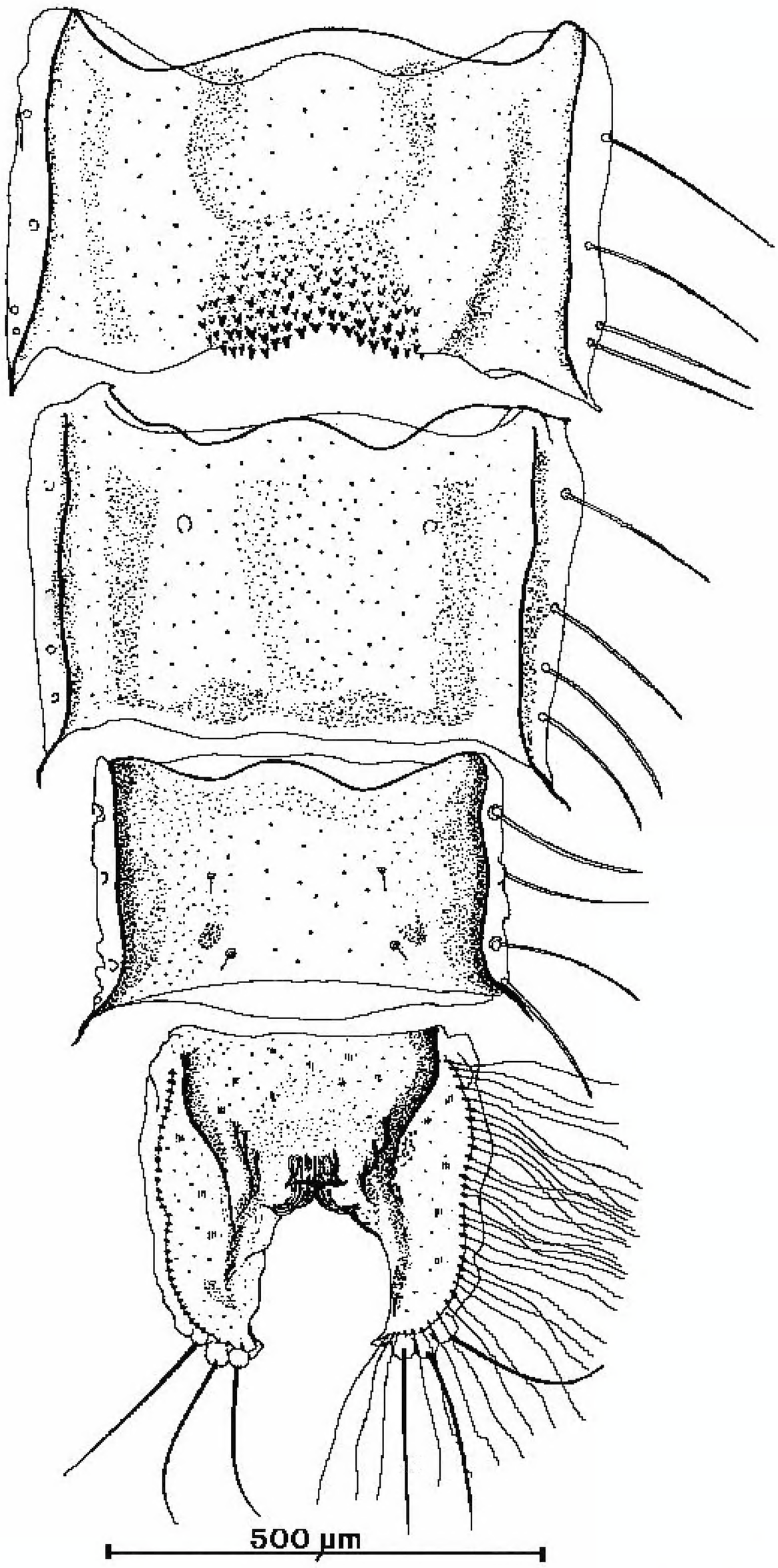

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